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FUELS AND RELATED EQUIPMENT

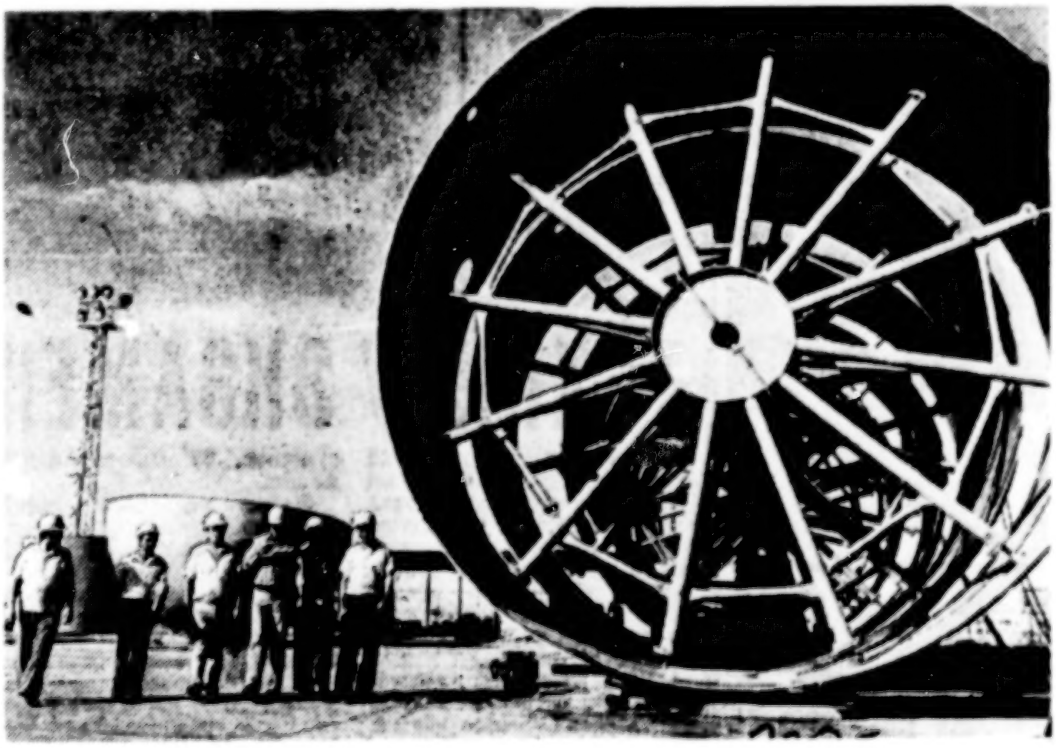
ELECTRIC POWER AND POWER EQUIPMENT

GDR EQUIPMENT INSTALLED IN SOVIET REFINERY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Aug 79 p 2

[TASS Article]

[Text] The first phase of the Chardzhou Oil Refinery will be able to process several million tons of crude oil per year. The largest construction job in the republic is picking up speed. The footings of the main production building have been laid, and installing work and the assembly of large-dimension equipment are in progress. Specialists from the GDR are laboring here, hand-in-hand with Soviet workers. Together they are installing equipment for the atmosphere-vacuum pipestill desalination installation (ELOU-AVT), which the Grimma Machine-Building Association of the GDR is supplying.



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ELECTRICAL-EQUIPMENT INDUSTRY REVIEWS PROGRESS, PROBLEMS

Moscow EKONOMICHESKAYA GAZETA in Russian No 31, Jul 79 pp 1-2

[Article: "The Electrical-Equipment Industry"]

[Excerpts] The electrical-equipment industry's output is being used in all branches of the national economy and is aiding further development of the country's power engineering and electrification. Minelektrotekhprom [Ministry of Electrical-Equipment Industry] associations and plants are shipping more than 80,000 items of modern machines, equipment and cable products.

Competing for a rise in production effectiveness and work quality, the industry's workers increased production volume, as is indicated in the diagram published here [shown here in a table] by 21.3 percent during the first 3 years of the five-year plan. About 80 percent of this growth was obtained through labor-productivity growth. During 1976-1978 the output of 4,400 items of new types of electrical machinery, devices, assemblies and household electrical appliances was mastered.

	1975	1976	1977	1978	1979 (plan)
Production of goods with State Emblem of Quality (percent of total production volume of Minelektrotekhprom [Ministry of Electrical-Equipment Industry])	32.5	35.3	38.5	42.7	43.5
Growth in output at Minelektrotekhprom enterprises (1975 = 100 percent)	100	108.1	115.2	121.3	126.4
Growth in consumer goods output at Minelektrotekhprom enterprises	100	110	123	134	143

In accordance with decisions of the party's 25th congress, highly effective generators of high capacity per unit were created for thermal, nuclear and hydroelectric power stations. They include specially built turbogenerators with a capacity of 1.2 million kw and a series of 500,000- and 800,000-kw turbogenerators. The Sayano-Shushenskaya GES is being equipped with hydroelectric generators of 640,000 kw capacity. The manufacture of "millionaire" turbogenerators for the Yuzhno-Ukrainskaya nuclear electric-power station is being completed.

The production of special highly reliable and economical electrical equipment for the mechanization and automation of labor-intensive processes in farm livestock departments, forcing beds, hothouses and grain-drying facilities and in land-reclamation and irrigation operations is being developed at an accelerated pace. During the Tenth Five-Year Plan the production of such equipment rose more than 1.6-fold.

New electric locomotives with more than 9,000 kw of power were designed for railroad transport. A test model of a northern version of the locomotive was fabricated for the BAM [Baykal-Amur Mainline]. Metallurgical enterprises are obtaining from the electrical-engineering industry more progressive electrical equipment for rolling mills, blast furnaces, and electroslag and induction furnaces. A set of blastproof electrical equipment with a potential of 1,140 volts has been created for coal mines. The use of this equipment enables the daily workload at one mine face to be brought up to 4,000 tons of coal. The production of high-moment electric motors that are supplied for machine tools with numerical-program control has been mastered. The output of equipment for the plasma machining of metals is being developed rapidly.

About 80 scientific-research, design and planning subdivisions and more than 250 associations and enterprises are participating in the production of electrical household commodities. Their output has increased 1.3-fold since the start of the five-year plan.

Thanks to the introduction of new types of electrical equipment and cable products for the national economy in 1976-1978, an economic benefit of 3.1 billion rubles was obtained.

The share of output of the highest-quality category grew from 32.5 to 42.7 percent of total production volume during the 3 years. The technical level of production rose substantially. Up to 75 percent of all capital investment was used for the rebuilding and expansion of existing enterprises. Since the start of the five-year plan, the industry's fixed production capital has grown by 35.2 percent.

Under the plan for 1979, production volume in the industry is to grow by 4.2 percent over last year's, including an 8 percent growth for consumer goods. Associations, enterprises and organizations are being called upon to master the output of about 1,400 new types of electrical equipment and to remove 500 obsolete products from production.

Scientists, designers and specialists are concentrating their efforts this year on the further solution of such important problems of scientific and technical progress as raising the automation level of electrical equipment, using the phenomenon of superconductivity in the designs of machines and apparatus, creating new energy sources based upon the thermonuclear reaction, and designing basically new types of transport.

Sources of Savings

In the electrical equipment industry, which requires millions of tons of rolled ferrous and nonferrous metals annually, the strictest economy in material resources is of special importance. Introduction into the industry of functional cost analysis, with an evaluation of the materials intensiveness of designs for equipment, has enabled specific materials consumption per item produced to be cut. But the utilization coefficient for steel rollings for the industry as a whole is still low: it is 0.67. In other words, a third of the metal goes to waste. The ministry is obligated to intensify the work to save rolled ferrous and nonferrous metals.

In this connection, any delay in introducing progressive industrial processes and designs that are less materials-intensive is intolerable. But such cases occur. Thus, at the Yaroslavl' Electrical-Machinery Building Plant an installation for economically cutting coiled electrical-equipment steel and for stamping it from a zigzag-shaped belt remains unmastered after more than 2 years. As a result, about 1,600 extra tons of steel are consumed. At many enterprises the production of conductors and cable with bimetal cores, cable with sheathing made of plastic and aluminum instead of lead, transformers with spiral magnetic circuits and diagonal joints, and series 4A electric motors, which enable reduced consumption of electrical-equipment steel, winding copper, cast iron and other materials, is being developed slowly. Much has to be done to improve the power-engineering characteristics of the electrical equipment produced in order to get more economical consumption of fuel and power resources.

One of the main sources for speeding up labor-productivity growth at electrical-equipment industry enterprises is mechanization and automation in every possible way. An instructive example in this regard is the laboring collective of the Zaporozhtransformator association.

In 3 years of the five-year plan, 174 measures for mechanizing work were carried out here that enabled the labor of more than 800 workers to be saved.

At the same time there are no few enterprises where opportunities for the mechanization of labor are used inadequately. This refers especially to casting, galvanizing and painting departments and to loading, unloading and warehousing operations. The share of manual labor for the ministry as a whole is 55 percent, and in the All-Union production associations of Soyuzelektroizolyator and Soyuzelektrosvet it is 62 and 63 percent respectively.

There is still much manual labor at such enterprises as the Slavyansk High-Voltage Insulator Plant, the Kalinin Electrical-Apparatus Plant and the Sredazelektroapparat and Azerelektrosvet production associations.

Ministry managers and workers of All-Union industrial associations and enterprises must take active measures to raise the mechanization level of production processes and of elevating-and-conveying operations. It should

be recalled that the responsibility for creating highly productive electrified means for the mechanization of loading, unloading and transport operations and for providing them to all branches of the national economy has been vested in Minelektroprom.

To a New Stage

By the middle of this year the share of output with the State Emblem of Quality had reached 43.5 percent of total production volume. However, one cannot be content with what has been achieved. A number of enterprises continue to produce low-quality output. Claims being presented by USSR Minenergo [Ministry of Power and Electrification] operating organizations against the turbogenerators of Khar'kov's Elektrotyazhmash plant and the power transformers of the Tol'yatti Electrical-Equipment Plant are well founded. Cases of the output of products of unsatisfactory quality at Tbilisi's Elektroapparatus production association, the Lys'va Turbogenerator Plant, and Tallin's Estoplast plant have not been eliminated.

There is a need to improve the suppying of materials and equipment to the electrical-equipment industry. A number of supplier industries break long-term commitments. USSR Minchermet [Ministry of Ferrous Metallurgy] delivers certain types of metal rollings with delays, especially cold-rolled dynamo steel, armored strip and lamellar strip, and USSR Mintsvetmet [Ministry of Nonferrous Metallurgy] does so with nonferrous metals. Minkhimprom [Ministry of Chemical Industry] does not deliver enough plastic compound for cable and certain types of varnishes. The quality of capacitor tissue produced by Minbumprom [Ministry of Pulp and Paper Industry] enterprises leaves much to be desired.

The further comprehensive development of our electrical-equipment industry is inseparably connected with expansion of the socialist economic integration of the CEMA member countries. This year new steps are being taken within the framework of the international organization Interelektro to realize 19 integrated scientific and technical programs that call for the creation of unified series of turbogenerators, high-voltage electrical equipment and unified electric-drive members, including asynchronous electric motors, automatic circuit breakers and a number of other articles. The work being done will allow maximum unification of designs, components and parts. As a result, the production of electrical equipment will be organized on a unified technological basis within the countries of the Council of Economic Mutual Assistance.

Systematic propagation of advanced workers' experience and businesslike support for innovator initiatives are the true paths to high effectiveness and quality. The number of production workers who compete in accordance with the example of the workers of Moscow's Dinamo plant on the basis of personal and brigade plans for raising labor productivity is growing. The collective of the Novocherkassk electric-locomotive manufacturers demonstrates a model of work without laggards. The experience of the Volga Motor-Vehicle Plant in improving the organization of production, labor and management is now being taken into the armamentarium.

Electrical-equipment industry workers should, during the second half of the year, bring additional reserves into operation in the drive for successful completion of the plan for 1979 and of the tasks for the whole five-year plan.

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ENERGY PROSPECTS FOR CEMA COUNTRIES DESCRIBED

Riga SOVETSKAYA LATVIYA in Russian 19 Jul 79 p 2

[Article by Boris Rachkov, candidate of economic sciences (APN [Novosti Press Agency]): "The Energy Resources of CEMA Member Countries"]

[Text] The Council of Economic Mutual Assistance is the only union of states in the world whose energy requirements are provided practically completely through its own energy resources. CEMA member nations import from third nations no more than 1 percent of all the fuel and power resources that they require. A high and completely reliable supply of fuel and electricity is one of the guarantees of the successful development of the fraternal countries' national economies.

Uninterrupted development of all fuel and energy branches is characteristic of socialist states. During the past 10 years the electric-power industry has essentially been created anew in Bulgaria, Hungary, Poland and Romania. The extraction of natural gas has begun to be developed in the Hungarian People's Republic, the GDR and the Polish People's Republic. The mining of coal, which is increasing constantly in the traditional coal-mining countries (the GDR, the Polish People's Republic, the USSR and the Czechoslovak Socialist Republic) is also being developed rapidly in Bulgaria and Romania.

During the years 1950 to 1977 CEMA member countries increased the production and consumption of the basic types of fuel and of hydroelectric power almost 5-fold: from 490 million to 2.2 billion tons of standard fuel equivalent. During this same period, the consumption of fuel and power in the developed capitalist states grew more than 3-fold, while their own production of primary energy resources grew only 1.5-fold. One of the causes is the fact that the long-term interests of the development of these branches in the countries of capital are sacrificed to the short-term advantages of exploitation of the developing states that are rich in oil.

Here is a typical example. In 1950 Bulgaria mined about 6 million tons of coal, or one-fourth as much as Belgium, and half as much as Holland. However, in 1977 more than 25 million tons of coal were mined in the People's Republic of Bulgaria, while in Belgium only 7 million tons were mined,

while in Holland this branch of industry has been entirely curtailed since the early 1970's.

Close collaboration of the CEMA member countries and mutual deliveries of energy bearer through foreign trade channels, plus the efforts of each nation, plays an enormous role in development of the fuel and power activities of CEMA member countries. For example, in 1966-1975 alone Poland shipped its CEMA partners more than 100 million tons of coal, and Romania shipped several tens of millions of tons of petroleum product. The main share of foreign-trade shipments of energy carriers within the CEMA framework is that of the Soviet Union, which created production capacity in the area of fuel and energy that takes into account the needs of the whole community.

While the production of primary energy resources in other CEMA member countries rose 2.6-fold in 1950-1977, in the USSR it increased 5.5-fold, from 320 million tons of standard fuel equivalent to 1.7 billion tons. This enabled annual shipments of oil and its products to be increased (by actual count) during this period, respectively, from 0.8 million to 77 million tons, coal from 0.6 million to 15 million tons. The export of natural gas from the USSR, which began in the 1960's, was 13.4 billion cubic meters in 1976. Output at full capacity of the recently inaugurated Soyuz gas pipeline will increase deliveries of Soviet natural gas to East European CEMA member countries by 15.5 billion cubic meters per year. The transmission of electricity from the USSR to the fraternal socialist states exceeds 10 billion kw-hr per year. Since introduction into operation at the end of 1978, the Vinnitsa (USSR)-Albertirsha (Hungarian People's Republic) LEP [electric-power transmission line], deliveries of electricity to the Hungarian People's Republic, the GDR and the Czechoslovak Socialist Republic will grow as a whole by 6.4 billion kw-hr per year. The USSR is today providing about 25 percent of the total energy resources consumed in the other countries of the community.

The 32d CEMA Session (1978) approved a long-term special-purpose program for collaboration in the areas of energy, fuel and raw materials. The accelerated development of nuclear power has been allocated a main share in it. In the 1980's, with the engineering cooperation of the USSR, a number of large AES's of 37 million kw capacity will be built in the European CEMA member countries and in Cuba and two more nuclear stations with a total capacity of 8 million kw, part of the energy of which will be delivered to European countries of the community, will be built in the USSR. The AES's will free these countries and Cuba of the necessity to increase their annual imports of energy resources by an estimated 75 million tons of standard-equivalent fuel, which is equal to half of the current fuel importation of the CEMA member countries from the Soviet Union.

Multilateral specialization and cooperation in the production of equipment for the AES's is called for. Thus, the Atommash plant is being built for this purpose in the USSR, and the capacity of other plants to produce the basic output of atomic machine-building--powerful reactors, steam turbines and a large variety of instruments and apparatus--is being expanded. Czechoslovakia has committed itself to the manufacture of reactor

installations, steam generators and main-circulation pipelines. Bulgaria intends to produce biological protection systems and fixtures, Hungary--mechanisms for servicing reactors, and Poland--pressurizers and diesel generators.

The long-term special-purpose program for collaboration also aims at using oil and gas mainly for the chemical industry and at replacing them in furnaces with solid energy bearers, the reserves of which in the European CEMA member countries alone consist of about 105 billion tons. More intensive refinement of oil is called for, which will be equivalent to the European countries of the community obtaining 15 million tons of additional fuel and lubricating oil per year.

The profile of collaboration in the area of prospecting and geological exploration has been defined, and it is planned to further expand mutually advantageous collaboration with developing states in the oil-industry area.

In January of this year the CEMA Ispolkom discussed plans for general understandings about collaboration in the erection, by the joint forces of the CEMA member countries concerned, of the first of the new AES's that are to be built on Soviet territory--the Khmel'nitsa Nuclear Electric-Power Station, as well as agreements about collaboration in the construction and operation of the Khmel'nitsa AES-Zheshuv (Polish People's Republic) 750-kilovolt electric-power line and the Zheshuv substation. The Ispolkom noted the effectiveness in the accomplishment of large-scale construction programs by the joint forces.

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LARGE RADIOSCOPY UNIT OPERATING AT 'ATOMMASH'

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Aug 79 p 4

[Article by Engineer A. Kilosov (Volgodonsk): "An X-Ray for Giants"]

[Text] A specially built installation for nondestructive inspection has gone into operation at Atommash.

The top of the "tower" is concealed somewhere in semidarkness. A massive door is moved aside and a humped bridge is lowered. And a feeling arises that you are standing before a medieval castle--lacking only the stamping feet of a knight's steed.

But this transient impression disappears right away when two high-capacity "carts" with load-carrying capacity of more than 1,000 tons come out on the bridge! A whole detachment of knights in heavy armor would prove to be too light a load. The time will come when the vessel of the first nuclear reactor will take its place on the carts. It was for this purpose that the "tower" that rises up int the main building of the Atommash plant--the country's largest X-ray inspection chamber--was built. And now the first welded joint has been examined in it with X-rays.

"This was a special event for all of us," says chief of the radiation-inspection laboratory V. Selivanov. "For 90 percent of the plant's output will be manufactured with the use of welding. And the thickness of the welds will in some cases reach tens of centimeters. It is not necessary to explain that high quality and reliability are the most important requirements laid on the equipment of a nuclear electric-power station. Methods for nondestructive inspection, and, primarily, radioscopy, using X-ray and gamma-ray inspection, will provide them. This chamber also was built to protect personnel, to shield them from the radiation. Parts will be inspected behind its 4-meter thick concrete walls.

The two carts slowly disappear in the chamber. Involuntarily, one wants to follow, to take a look inside. No, for the entrance for people is on the opposite side. And even here the door provokes respect: the steel slab, 12 cm thick, has several automatic interlocks. No one can be in the chamber when X-ray operation begins. And if the door still remains open,

the radiation ceases there. Even what would seem to be improbable situations are foreseen. Let's say someone suddenly turns up accidentally in the "tower" at a hazardous moment--then the door can be opened and the apparatus stopped.

The chamber's interior space unexpectedly opens up because of a rotation, and right away its height and spaciousness astonishes one. Here several energy emitters have been installed. Each has its "territory," its specialty. Comparatively small X-ray devices are used for examining welds 5-60 mm thick. And when metals tens of centimeters thick--a reactor vessel, for example--must be studied, a most powerful LUE-15 linear accelerator goes into operation. It emits 15,000 electron volts of energy.

"It is also possible to inspect metal of such thickness," says V. Selivanov, "in another linear accelerator--a linotron. The energy of its radiation is 8,000-9,000 electron volts. We also have betatrons that will examine welds of average thickness. It must be noted that installations for defectoscopy of such thickness and of such a class still have not been created in our country. The maneuverability of this apparatus is especially valuable. Take a look at the LUE-15...."

Actually, this emitter--a massive structure of multimeter length--literally hovers in the air. Until now such apparatus has been stationary and installed on a concrete footing. A crane moves it freely in three dimensions. And for inspecting inaccessible places within articles, convenient isotope radiation sources made in the form of flexible tubes are used.

Powerful mechanisms rotate the body parts that enter the "tower" on the carts, in a position convenient for examination. The operator places a film cassette in them--then it is time to leave. When the steel door has been closed tightly behind them, I once more visit the tower. A four-story lean-to has been built onto it: in it, in comfortable rooms situated one on top of another, the film is interpreted, and the quality of the product is subjected to a precise analysis.

The rays of the setting sun light up the "tower." Several other installations also have been built here. And again it seems to me that I see a fortress. No, not of the medieval but of the most modern kind. Here at Atommash, they are erecting bastions that will stand as a guard of the reliability of nuclear reactors.

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ESTONIAN SHALE-BURNING POWER PLANT PREPARES FOR WINTER

Tallin SOVETSKAYA ESTONIYA in Russian 24 Jul 79 p 2

[Article by K. Senchugov, director of the Estonskaya GRES: "Winter Is a Strict Examiner"]

[Text] The recently adopted CPSU Central Committee and USSR Council of Ministers decree, "Providing the National Economy and the Populace with Fuel, Electricity and Heat During the Fall and Winter Period 1979/80," has set major tasks for the country's power engineers. We electric-power station workers should generate electricity and thermal energy in the quantities that the national economy and the population require. And if the power station can, at any moment, on command of the controller, raise its power to the maximum possible level and hold it there as long as necessary, then the powermen say that readiness has been provided for.

An electric power station's readiness always is of great importance, but it increases immeasurably during the fall-and-winter peak in the demand for heat and electricity. During this period, not only the readiness of the equipment to operate at full power but also the readiness of the people to work self-sacrificingly is tested most completely. Behind this concept stand our daily work and concern and a drive to improve the Estonskaya GRES's operating indicators.

Ten years ago, on 30 June 1969, the following entry was entered in operations journal No 1 in the handwriting of shift chief A. Uuskyul, now the station's deputy chief engineer for operations: "Station generator No 1 was switched on in parallel." Since that moment, the Estonskaya GRES has generated more than 64 billion kw-hr of electricity. At that moment the drive began to reduce fuel consumption per kw-hr of electricity and per kw-hr used for our own needs.

As is known, the Estonskaya GRES is today the world's most powerful high-pressure electric-power station that burns low-calorie shale as fuel. It is natural that the specific characteristics of the shale fuel complicate conditions for operation and repair of equipment and create difficulties that are not encountered by the collectives of power stations that operate on "nobler" types of fuel. But nevertheless, the Estonskaya GRES collective has managed over past years to outdo all the designed indicators.

The most important of them is specific consumption per kw-hr of electricity dispatched to the customer, for this is what greatly determines the economic effectiveness of the station's operation. This indicator depends directly upon the size of the load of the power units, the effectiveness of the measures taken to raise the equipment's economic effectiveness, and the experience and qualifications of operating and repair personnel.

Analysis indicates that about 50 percent of the growth in average load has been achieved by raising the boilers' operating reliability and by shortening boiler-repair periods. Forty percent is the result of mastering the capacity of the power units available, and 10 percent is the result of an increase in filling the yearly load schedule. The average pace in reducing specific fuel consumption for the entire period of station operation has amounted to about 1 percent. Thus, while in 1970 specific consumption was 465.7 grans of standard fuel equivalent per kw-hr of electricity generated, this year it is 409. The 56.7-gram reduction in fuel consumption saved 1.5 million tons of shale. We would have required almost a half year's winning of the Narvskiy strip operation if specific fuel consumption had remained at the 1970 level.

The consumption of electricity for in-house needs also is one of the indicators that characterize the economic effectiveness of operations. This amount was 10.2 percent in 1970, it reached the designed value of 9.2 percent in 6 years, and it has now been reduced to 7.8 percent. For clarity, let us say that if the Estonskaya GRES operated today with the same consumption of electricity for in-house needs that it did in 1970, the country would have received 200 million kw-hr less electricity.

Achievement of the indices shown enabled the operating cost per 10 kw-hr of transmitted electricity to be reduced from 8.95 kopecks in 1970 to 6.85 kopecks this year. And right now we can say that the Estonskaya GRES is generating the cheapest electricity in the Northwestern Power Association.

The station's collective greeted the CPSU Central Committee and USSR Council of Ministers decree with this asset. Nevertheless, the fall-and-winter peak of the load is always a severe test for power workers. This year, as in past years, the Estonskaya GRES is earnestly getting ready for it. Overhaul of the main power equipment is being conducted by our general contractor--Estonenergoremont's centralized repair department. We do current repair of the basic equipment and overhaul auxiliary equipment with our own forces. As a rule, the main difficulty of preparation for the winter falls on three departments, which bear primarily the full burden of the fall-and-winter peak: the fuel-handling department, which provides for the receipt and preparation for burning of up to 46,000 tons of shale per day, the boiler and turbine department, which is required to burn this fuel in the boilers and provide for stable operation of the power units, and the ash-loading department, which engages in the removal of about 20,000 tons of ash and slag per day to the ash dump. The collectives of these departments, which are under department chiefs A. Bystrov, V. Zabolotnyy and M. Brach, are today coping successfully with the work required to prepare for winter.

Questions of insulating and heating the premises--lessons learned from last winter's difficult days--have a major place in the plans for preparing the station. And those days actually were difficult. On 26 December of last year the temperature of the air began to drop sharply, reaching 42.6 degrees on 30 December. These few days were enough to show us where we had overassessed our potential, to reveal the bottlenecks and to plan ways to eliminate them.

It must be noted that the sharp cold spell did not affect operation of the basic equipment that was located within the operating premises. The efforts that we had expended in the summer and fall on insulation and warming of the electric-power station were telling. The Estonskaya GRES operated with adequate stability under the difficult conditions. Deviations from the dispatcher's load schedule were insignificant in amount and duration.

However, fuel supply proved to be a weak link. And not because we did not foresee something in our plans or did not execute the contemplated measures. Several years ago heating of the hoppers of the cartippers and fuel storage was introduced and systems for pneumatic breakup of the fuel in the boiler hoppers were installed. But these measures proved inadequate when strongly frozen shale was received.

A reduction in fuel shipments from the Narvskiy, Sirgala and Vivikond strip operations required an intensification of fuel delivery from storage by bulldozers. It was here that the shortage of them became obvious. Moreover, the cartippers at the initial receiving point, methods for insuring normal passage of frozen shale through the hoppers and discharge hoppers of the fuel-handling route, methods for breaking up the fuel in the boiler hoppers, and so on, proved unreliable.

The station has not been provided with the designed number of warehouse bulldozers; 11 of them are required but there are 6. In this connection, we are expecting from the USSR Ministry of Power and Electrification the speediest possible solution to questions of supplying the station with bulldozers and of allocating at least two spots annually for factory overhaul of them, and help in working out fuel-handling problems. Minenergo [Ministry of Power and Electrification] and the USSR Ministry of Railways should, in accordance with the new decree, also solve the question of allocating spots for factory overhaul of the station's rolling stock.

All this, in concert with the efforts of our collective, will help the Estonskaya GRES to meet the new winter fully armed and to have the concrete means for realizing the measures contemplated in the decree.

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ENACTMENTS AFFECTING POWER ENGINEERING NEED REVISION

Moscow KHOZYAYSTVO I PRAVO in Russian No 2, Feb 79 pp 15-21

[Article by V. Mikhaylov, chairman of the VSNTO [All-Union Council of Scientific And Technical Societies for Industrial Power Engineering] and candidate of engineering sciences: "Power Engineering: Effectiveness and Savings"]

[Excerpt] The consumption of energy resources is growing steadily throughout the whole world. In the first half of 1978, 600 billion kw-hr of electricity were generated in our country. In 1980 power generation is to reach 1.38 trillion kw-hr, and recovery of all types of fuel will be an estimated 2,029 million tons of standard fuel equivalent.

The enormous growth of the power-engineering activity has led to a qualitative change in mutual relationships within the economy. It has been necessary to regulate them with new decisions and decrees. Legal regulation of economic activity in the field of the production and utilization of fuel and power resources is now being effected by a large number of different enactments of a legislative nature.

The existence of a large number of uncoordinated enactments and regulations contributes to the appearance of cases where individual legal norms contradict each other, and it also affects negatively provisions for making the most rational use of energy resources.

We shall show this by a number of concrete examples. Prices have been established in the country for various types of power-engineering resources (coal fuel, gas, mazut and so on). When making comparability calculations about the choice of one design solution or another, an evaluation of the power-engineering component of the costs is made in terms of overall costs in accordance with "Guiding Instructions on the Use of overall costs for Fuel and Electricity." In this document the cost of fuel has been differentiated by economic region of the country, since the overall costs also consider the expenditures for transporting the fuel. Such calculations enable a solution that is optimal from the national economy's standpoint to be obtained.

However, another rule has established for oil-refining industry enterprises preferential prices for mazut and gas (used at these refineries as furnace fuel) that are one-fifth to one-sixth the prices established for other branches of the national economy. Thus it is not profitable for these refineries to replace petroleum fuel by coal, even in regions where the overall costs for coal are substantially lower than for petroleum fuel. But indeed an enormous amount of this most valuable product, which is in short supply, is burned (up to 7 percent of the crude refined) in the industrial furnaces of oil refineries. Such a situation has prevailed only as a result of noncoordination, incomplete consideration and the adoption of corresponding rules.

Unfortunately, the negative consequences of this solution have their sequel. As is known, centralized supply of heat from a TETs is the most economical system for meeting thermal-energy requirements. However, it is more "economical" for the refinery to build its own small boilerhouses, since the cost of heat obtained from a TETs will be much higher (because of the higher prices that the TETs pays for fuel).

Such a trend is characteristic also for certain other branches of the national economy that obtain fuel at preferential prices. The lack of a unified legislative enactment about fuel supply procedure renders it more advantageous for many enterprises, based upon agency policies and standards, to build small boilerhouses that are inefficient but are "their own." For indeed, small boilerhouses consume several times more fuel than TETs's do per unit of heat output. More than a million persons are engaged in the operation of these small boilerhouses today. This is a reserve, since there is a work-force shortage, and it is not small.

Let us examine certain other problems.

A characteristic feature of electricity is the inseparability of its generation and consumption, that is, there is a correspondence between the schedule for generating electricity and the consumption schedule. Power-system load schedules have two clearly defined peaks--morning and evening. Between the morning and evening peaks is a zone of relatively reduced load, and a deeper reduction (a dip) takes place at 1800-2000 hours in the evening. The development of production facilities with continuous industrial processes will help to smooth out the power-system schedules, but a rise in the share of household and municipal electrical consumption, and also the conversion of some production facilities to single-shift operation, will increase the unevenness of the load schedule. On a winter workday, the difference between the peak and the nightly dip in the USSR's Unified Power System (YeES) is 40 million kilowatts, and the speed in load buildup during the morning hours is 700,000 kw per minute. Covering the unevenness of the schedule involves large additional expenditures for the erection of peak-power capacity and the necessity for short-term shutdown for several hours of large generating capacity during the nighttime dip. This leads to a substantial overexpenditure of fuel (several millions of tons annually.)

Thus:

In the morning there is not enough capacity at electric-power stations, and in the evening they are underloaded by 40 million kw; and

The electric-power stations are waging a drive to save literally each gram of fuel per unit of electricity generated, yet at the same time millions of tons of fuel are consumed in converting generating equipment to idle running or to shutting it down and starting it up later.

The load schedule can be smoothed out considerably if industrial enterprise operation in a regime that regulates the consumption of electricity is called for. Enterprises that operate under this regime are called regulator-consumers (PR's). The concept of the use of PR's is that the consumers install additional industrial capacity that enables the planned output of product to be provided for, where the maximum workload occurs during night hours and the minimum workload occurs during the power system's morning peak. Economically, this is justified by the fact that the outlays for 1 kilowatt of industrial capacity are only a fraction of the outlays for 1 kilowatt of generating capacity. The cost of one and the same amount of electricity that is generated under a smoother schedule, other conditions being equal, will always be lower than where there is an uneven power-system load schedule. Of course, when selecting enterprises for operation in the PR regime the sociological factor should be considered, that is, improvement in working conditions, including a reduction in the employment of workers at night. But around-the-clock operation of some production facilities is industrially inevitable. Therefore, when selecting PR's, it is necessary above all to be oriented to around-the-clock production work with electricity-intensive processes and with a small number of servicing personnel, and to automated processes and enterprises.

However, when an agency makes an analysis of the effectiveness of using PR's that does not provide for an integrated approach to capital-investment planning, a mistaken conclusion that contradicts the national economy's interests is inevitable. This is obvious from the following example.

In order to produce 50,000 tons of carbide it is necessary to install a furnace with a capacity of 20 megawatts at a cost of 1 million rubles (50 rubles per kilowatt of industrial capacity). Such a furnace should operate around the clock (7,500 hours, taking repair and preventive-maintenance time into account). Since this capacity (20 megawatts) is superimposed upon the whole day's load schedule for the power system, a corresponding capacity of 22 megawatts (taking grid losses into account) must be introduced, which, at a cost of 200 rubles per kilowatt of power capacity, will require 4.4 million rubles. Total outlays for the national economy will be 5.4 million rubles.

But in order to produce this same amount of carbide, a furnace with a capacity of 40 megawatts can be installed: it will operate at full capacity only at night, and the rest of the time at a capacity of 10 megawatts. Then

the installation of furnaces requires not 1 but 2 million rubles. At the same time, since operation at 40 megawatts of capacity occurs only when the power system is not loaded up, and in the variable zone the additional load is 10 megawatts, only 11 megawatts of power capacity (taking losses into account) must be introduced, for the sum of 2.42 million rubles (instead of 4.4 million rubles). Total outlays for the national economy in so doing will be 4.42 million rubles (and not 5.4 million rubles). Accordingly, the power system's fuel consumption (by adjusting the schedule) under the second variant will be 10 percent less. Despite all the obviousness of the advantages of the second variant, such decisions are not made in practice under the agency approach.

The course of the discussions is simple--in the first variant, capital investment for production of the planned amount of carbide is 1 million rubles and, in the second option, 2 million. Consequently, it is "more advantageous" to adopt the first one. The industry does not consider the fact that in this case 1.05 million rubles more capital investment are required (through increased expenditures in another branch of the economy). Nor does the industry take into account the fact that under the first option, bills for electricity will be higher than under the second by 250,000-300,000 rubles (depending upon the region in which the electricity is being supplied), since the costs will be included in calculations of the cost of the product.

Moreover, if enterprises have industrial-capacity reserves (used to regulate the electricity-consumption regime) and if output of the product must be increased, then the enterprise will automatically be brought up to the full workload without a consideration of the expenditures that are inevitable in such a case on the part of an interfacing branch--the power industry. One of the arguments for this solution is the assertion that, in so doing, the utilization coefficient of their own capital is improved, but the worsening of utilization of the national economy's capital that is inevitable under such an approach is not considered.

Also reflected here is a lack of coordination of the requirements of the various existing enactments. One of them observes the need to take steps to smooth out power-system load schedules and, at the same time, another notes the necessity to raise capital utilization (without taking into account the use of capital in power engineering). Moreover, even where these contradictions have been reconciled, that is, where regulator-consumers are introduced who will enable better use of the national economy's capital, a saving of fuel and a reduction in outlays for production and the consumption of electricity, a contradiction with other standards arises. The activity of the Ministry of Power's power-marketing administrations is evaluated by the monetary intake (the "famous" evaluation according to the gross). As was indicated above, smoothing out power-system load schedules will help to reduce the cost of electricity. Consequently, the Ministry of Power's power-marketing administration will obtain a smaller sum (but not a loss for the ministry or the entire national economy) for the same amount of electricity that is released to customers under a more uniform load schedule. Therefore, a contradiction arises between the

engineering policy that the power marketing administrations should pursue and the indices that evaluate their activity. It follows from this that norms that will eliminate these and similar contradictions must be introduced into our economic legislation.

Savings of power resources also are poorly stimulated. The cost of energy consumed in the structure of expenditures for producing industrial output is not relatively great, consisting of 4-6 percent of the total cost of the output for the entire national economy. It is as if a certain carelessness in industrial branches with regard to energy savings is created, since a saving of even 20 percent is reflected in the cost of the product by only 1.0-1.2 percent. There is the same attitude toward the preservation and repair of power-engineering equipment in power-consuming branches of the national economy, for the characterization of which the mistaken term, "minor power-engineering," to distinguish it from "major power-engineering," by which is meant the industry for producing electrical and thermal energy, has taken firm root among us. This term is a phenomenon of a profound fallacy in evaluating the power-engineering activity, which also is a consequence of the branch-of-industry approach to questions of power engineering. As a matter of fact, the total capacity of the power-engineering equipment in the consuming industries is several times that of the industry that generates power. Thus, for each kilowatt of generating capacity of the Ministry of Power and Electrification there are more than 7 kilowatts of installed capacity at industrial enterprises. That is why it would seem that, in the interests of the state, standard enactments that would introduce a new and progressive system for stimulating the saving of fuel and all types of energy consumed in the national economy should be created.

At present surveillance over the rational use of energy resources is being accomplished by various organizations--Gostopnadzor [State Inspectorate of the Fuels Industry] of USSR Gossnab, Gosgaznadzor [State Inspectorate for the Gas Industry] of Mingazprom [Ministry of Gas Industry], the State Inspectorate for Energy Surveillance of USSR Minenergo [Ministry of Power and Electrification] and others. It is natural that, under such circumstances, an agency approach is inevitable, and an integrated sytems approach to solving this important problem is lacking. From this comes the completely natural conclusion: it is necessary to create, instead of uncoordinated organizations, a single state organ for surveillance over the state of the country's energy activity.

Many more examples of a nonintegrated approach to the examination of various power-engineering questions could be cited. The agency attitude toward such questions does not provide for obtaining a national economic optimum.

The necessity for putting order into supervision of and surveillance over the rational use of power-engineering resources was noted in the decisions of the All-Union Scientific and Technical Conference, "Ways to Raise the Utilization Effectiveness of Fuels, Electricity and Heat Energy in Industry," (Gomel', 1977), which was organized by the VSNTO Committee for Industrial Power Engineering.

The Accountability Report of the CPSU Central Committee to the 25th CPSU Congress noted that "the managerial and, above all, the planning activity should be aimed at /final national-economic results [boldface]/. Such an approach is becoming especially urgent with the growth and increasing complexity of the economy, when these final results depend increasingly upon a multitude of intermediate elements and on a complicated system of intra-industry and interindustry interrelationships....Much has to be done also to improve the legal regulation of economic activity. Our laws in this sphere should provide more actively for the solution of problems of raising output quality and of observing the savings regime." These instructions relate in full measure also to the improvement of legal relationships in power-engineering activity questions.

11409
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VARIETY OF SOLAR-POWER ENGINEERING MEASURES INTRODUCED

Moscow STROITEL'NAYA GAZETA in Russian 25 Jul 79 p 4

[Article: "The Sun's Energy"]

[Excerpts] Tashkent. A conference of experts of Council of Economic Mutual Assistance countries that was held recently planned a program of collaboration in the area of solar energy use. Special attention was paid to the joint development of effective methods for transforming the sun's radiant energy into electrical, thermal and mechanical energy. Representatives of Bulgaria, Hungary, Poland, Romania and Czechoslovakia evaluated highly the devices and instruments created at the solar proving grounds, laboratories and design bureaus of the Uzbekistan Academy of Sciences.

Chirchik. In the young city of Chirchik Uzbekistan's scientists have realized for the first time a design for "solar housing"--a building that obtains heat directly from the sun.

"The idea of housing that is built upon the basis of energy supplied by daylight has attracted architects and engineers for a long time," said corresponding member of the Uzbekistan Academy of Sciences G. Umarov. "The four-story 'solar-housing building' in Chirchik is the first experiment set up in an environment of an actual apartment house. The choice of a standard design was not accidental. The scientists decided to prove that a solar-energy supply can be used in large-scale housing construction."

Ashkhabad. The country's first Scientific-Research Institute for Solar Energy has been working since the start of the year at the Academy of Sciences of Turkmenia. Its collective is working to create and introduce into the national economy highly effective devices that will operate on the sun's energy.

In recent years the republic's scientists have been working on dozens of solar devices. Today the task of creating autonomous solar complexes is being faced.

Tynda. Engineers of a special industrial design bureau of Glavbamstroy [Main Administration for Construction of the Baykal-Amur Mainline] have developed a design for a two-unit apartment house whose radiators are heated by the sun's rays.

The cost of the arrangement designed for catching the rays is not great, and, together with ordinary electric heating, it will enable the consumption of electricity to be reduced by one-third.

Riga. The strength of sunlight in an apartment can be regulated by turning the lever of an electrical instrument. Experiments by scientists of the Scientific-Research Institute of Solid-State Physics of the Latvian University have led to this result. A thin-film chrome coating electrically deposited on glass whose transparency and coloring change under the influence of a direct current has been developed here.

Alma-Ata. Reflected solar light spots have been included in the therapeutic arsenal of Kazakhstan's pediatricians. A reflector that consists of 200 small mirrors focuses the sun's rays. It provides for deep therapeutic warming up of the body.

The Kazakh Scientific-Research Institute for Pediatrics has created the Soviet Union's first children's solar center.

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SPECIAL DISSOCIATED GAS PROPOSED AS NUCLEAR-REACTOR HEAT CARRIER

Minsk SOVETSKAYA BELORUSSIYA in Russian 22 Jul 79 p 2

[Article by V. Khodosovskiy (BELTA (Telegraph Agency of the Belorussian SSR]): "The 'Brig' Raises Its Sails"]

> [Text] "...Establish a link between academic institutes and the work of operating organizations....Promote work along sponsorship lines for industrial and agricultural regions of the republics."--From an Agreement on Socialist Competition Among the Academies of Science of the USSR, UkSSR and Belorussian SSR, 1930.

Almost five decades separate this document on creative collaboration and coordination, the first in the history of domestic science, from another document: the recent results of collaboration of scientists of the Ukraine and Belorussia. If you compare them, the long path traveled by our science in five-year plan stages is obvious.

Staff workers of the Institute of Nuclear Energy of the Belorussian Academy of Sciences have been pondering how to raise the effectiveness of the second generation of nuclear electric-power stations and to simplify their design. They have proposed to use a special dissociating gas as a heat-carrier for this purpose instead of the traditional mixture of sodium and helium.

Its disadvantages are indisputable. Several cumbersome intermediate loops are immediately eliminated and, what is especially important, the country's power engineers will obtain an additional type of fuel--uranium-238, which previously has gone to waste. A reactor based upon fast neutrons with a dissociating heat carrier--its research model has been named the Brig-300--can simultaneously operate as a plant for producing nuclear "fuel" for other nuclear electric-power stations.

And now a rough outline of the first Brig has been created. In order to unfurl its atomic sails, Belorussian physicists needed the help of Ukrainian colleagues from the Institute of Electrical Welding imeni Paton and

other research institutes, which, by joint efforts, have speeded up the solution of this urgent national economic problem.

"The initiators of the competition--Ukrainian and Belorussian scientists--today are linked by especially close ties," says chief scientific secretary of the Presidium of the Belorussian Academy of Sciences L. I. Kiselevskiy. "The Brig-300 is only one of the subjects of collaboration, the main task of which is to speed up scientific and technical progress and the introduction into practice of the results of basic scientific and technical research. We are jointly solving the problems of using heat and mass exchange in industrial processes. A major program for studying the geological structure and for evaluating reserves of useful minerals in the Ukraine, Belorussia and Moldavia is being executed. Interesting results have been obtained from the collaboration of geneticists and breeders."

Today's scale of these fruitful ties can be illustrated at least by this example. Forty institutes and organizations of the neighboring republics are working on the problem of an integrated study and rational use and the preservation of the natural resources of the Poles'ye, Dnepr, Pripyat' and Dnestr rivers. The result is a transformation of a whole district, which today has become one of the main livestock-raising regions of Belorussia.

The birth of an unquenchable enthusiasm during the first five-year plan and the creative collaboration of scientists will multiply the strength of Soviet science.

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BRIEFS

NEW URENGOY GAS FIELD--Construction of a new gas-field facility has started at the Urengoy gas deposit, near the Arctic Circle. Unlike existing gas fields, the gas here will be not only cleaned but also cooled. This will enable the permafrost on the pipeline route to be preserved while the gas is being transported across the tundra. The new area's capacity will be 1 billion cubic meters of gas per year. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 31, Jul 79 p 3] 11409

PECHORA POWER PLANT--Pechora (Komi ASSR). The builders of the Pechora GRES are using the bright polar summer "nights" to the maximum. This will help them to beat the schedule. The erection of a second power unit was started here yesterday, 2 weeks ahead of time. The Pechora GRES will be the power-engineering heart of the Timan-Pechora regional production complex that is being formed. With startup of the first phase, the station will start to generate as much electricity as is now being produced by all the electric-power stations of the Komi ASSR. [Text] [Moscow MOSKOVSKAYA PRAVDA in Russian 19 Aug 79 p 1] 11409

GALLIUM-ARSENIDE SOLAR CELL. The photostorage cell--this is the name given to a new element with a liquid semiconductor junction that was developed by specialists of the UkSSR Academy of Sciences. It is intended for converting solar energy into electrical energy. As experience has indicated, the element possesses fairly high efficiency. Structurally, this device was made in the form of a clear polymer container filled with a chemical solution. Two electrodes have been submerged in it: one is made of gallium arsenide, the other of carbon. Under the influence of solar light, a current begins to flow between these electrodes, as in the case of an acid battery. It is assumed that the photostorage cell's service life will be several years and that it will be both more economical and more stable in operation than other solar-energy converters based upon semiconductors. The photostorage cell is being demonstrated in the Chemistry Pavilion of the Exhibition of Achievements of the National Economy of the USSR. [Text] [Kishinev SOVETSKAYA MOLDAVIYA in Russian 13 Jul 70 p 4] 11409

EXPECTED CHERNOBYL'SKAYA AES PERFORMANCE--The first two power units of the Chernobyl'skaya Nuclear Power Station in the Ukraine will generate 11.5 billion kw-hr of electricity by the end of the year. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Aug 79 p 2] 11409

LENINGRAD UNDERGROUND POWER CABLE--Leningrad. Lenenergo [Leningrad Regional Power Administration] specialists have created an underground electrical bridge. The laying of the first phase of a cable power-transmission line with a potential of 220,000 volts was completed today. The system of conductors passes through a steel sheathing that is filled with an insulating oil under 15 atmospheres of pressure. The underground power-transmission line will permit the removal of the overhead lines in the city. In so doing, losses of power during transmission from the power station to the residential blocks and enterprises will be cut by three-fourths. [Text] [MOSKOVSKAYA PRAVDA in Russian 1 Aug 79] 11409

MOLDAVIAN POWER CHIEF HONORED--For fruitful work of many years in the republic's soviet organs and active participation in public life, and in connection with the birthday of the Moldavian SSR Supreme Soviet, chief of the Main Administration of Power and Electrification under the Moldavian SSR Council of Ministers Comrade Boris Petrovich Karpov was awarded an Honorary Testimonial of the Presidium of the Moldavian SSR Supreme Soviet. [Text] Kishinev SOVETSKAYA MOLDAVIYA in Russian 29 Jul 79 p 3] 11409

NEW THERMAL-INSULATION TESTER--How reliable is the thermal insulation of TETs equipment? Where are the "breaks" in it, and what is the amount of leakage of thermal energy? A device created by scientists of the Institute of Heat-Physics Engineering of the UkSSR Academy of Sciences can help to answer these questions. A circular bar the size of a 5-kopeck coin, like a doctor's stethoscope, listens to the "breathing" of insulation and instantly transmits all the data to a measuring instrument, which also reports the necessary information. "The sensor is the main part of the heat measurer," says director of the operations, corresponding member of the UkSSR Academy of Sciences O. A. Gerashchenko. "It consists of 2,000 of the finest thermoelement whiskers, which provide exceptional sensitivity. By linking this microbattery of whiskers with any surface and passing a heat flow across it, a temperature difference arises on the sensor's face that generates an electrical signal. Its value, which is registered by the measuring instrument, corresponds to the thermal losses, which are computed on a scale. Information about this is needed primarily by operators. For, exceeding by 1 percent the permissible norm for heat transfer of, let's say, the equipment of a TETs of average capacity, an additional expenditure of 600 tons of fuel per year is required. This means that the Kievenergo [Kiev Regional Power Administration] system alone would have to burn about six trainloads of coal above the planned amount." Large power plants of Kiev, the Donbass [Donets Coal Basin], Dnepropetrovsk and Vinnitsa, as well as most of the republic's sugar mills, have been equipped with the new instruments. [Text] [Kiev RABOCHAYA GAZETA in Russian 17 Aug 79 p 2] 11409

SUPERHIGH-VOLTAGE POWER LINE--Leningrad. Leningrad enterprises have undertaken to supply equipment to the superhigh-voltage Itat-Novokuznetsk electric-power transmission line. The LEP [electric-power transmission line], which is under construction and was designed for a potential of 1.15 million volts, will be the world's first industrial power-transmission line for its class of potential, which is today's highest. It will be able to send streams of electricity 3-4 times as high in energy as those now being sent over the lines in use, over thousands of kilometers. [Text] [Moscow MOSKOVSKAYA PRAVDA in Russian 16 Aug 79 p 1] 11409

EKIBASTUZ POWER-UNIT INSTALLATION--Ekibastuz. Ekibastuz GRES-1 will provide for the effective manipulation of streams of electricity between power systems that are located in various time zones. Assembly of the first 500,000-kw power unit has entered the final stage at this important Kazakhstan construction project, and installation of the second such unit has commenced. "They are to go into operation this year," says general director of the construction project's installers, Ya. Sergeyev. "This is why the work is going on in three shifts, under an improved schedule." Mere weeks remain before startup of the first GRES unit, which will improve the energy balance of Kazakhstan and adjacent regions. The first high-voltage arterials for transmitting Ekibastuz power to Central Kazakhstan have already been prepared. Altayskiy Kray and West Siberia are already prepared. The erection of a line to connect GRES-1 to the trans-Kazakhstan LEP-500 [500-kilovolt electric-power transmission line], which stretches from the Irtysh to the South Urals, is being completed. [Text] [Moscow IZVESTIYA in Russian 17 Aug 79 p 1] 11409

CSO: 1822

FUELS AND RELATED EQUIPMENT

DEPUTY MINISTER ON OIL PRODUCTION CYCLE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 27 Jul 79 p 2

/Article by V. Mishchevich, First Deputy Minister of the Petroleum Industry: "Oil Wells in Production"/

/Text/ A few years ago the meters drilled and the so-called commercial speed were the main indices for evaluating the performance of drilling enterprises and brigades. This was all logical and clear. The greater the speed the more meters of rock were drilled and therefore the more appreciable the result. But let us consider more carefully how incontrovertible this logic is.

The drillers are also builders. They build new capacities for extracting oil. Does the index "meters drilled" reflect this major objective? Only partially. Fulfillment of the drilling assignment by no means meant any addition to the productive capital of the wells. Many of them stood for a long time awaiting activation after they were drilled to the planned depth. Pursuit of greater "metrage" often led to increases in unfinished production.

The situation cannot be radically improved until the drillers concentrate on the end result, namely delivery of wells quite ready for operation to the oil workers, instead of the intermediate results (meters and speed). In other words, a whole new approach to evaluation of the drillers' performance is needed, and a break with the traditions of decades.

Some of the first to do this are in the Al'met'yevsk Administration of Drilling Operations of the Tatneft' Association. Foreman D. Nurutdinov's brigade proposed not just drilling wells but also activating them with its own forces. They made an agreement to compete with the associated subunits of derrick riggers, pluggers /tamponazhniki/ and oil field workers. Joint arrangements were made to expedite construction of the wells as far as possible and to activate the oil extraction capacities as soon as possible.

After D. Nurutdinov's letter "Oil Wells for Production!" was published in SOTSIALISTICHESKAYA INDUSTRIYA, the competition under this slogan became extensive. To be sure this did not happen at once. The force of inertia was too strong. Many expressed the fear that the brigade would lose in drilling and consequently in

pay by working in a continuous "drilling-activation" cycle. This could actually happen if the drillers' work is rated in meters as before. But what if completed wells are the criterion instead of meters?

The board of the Ministry of the Petroleum Industry considered this question in all its aspects, carefully weighing all the pros and cons. They decided to change the system of planning and material incentive and the organization of drilling operations to provide for continuing construction of oil extraction capacities, and they made the number of activated wells the main, controlling index, relegating meters to second place. Jointly with the sectorial central committee of the trade union, they also made the corresponding corrections in the terms of the All-Union Socialist Competition among brigades of the main occupations of the sector.

Then as we acquired experience we never had to revert to the problems of expediting the construction of oil wells. They were discussed at meetings of the scientific-technical council, sectorial conferences and seminars, councils of directors of the oil and gas extraction associations, and meetings of the ministry managers with winners of the competition between the drilling and derrick rigging brigades. In this way the basic principles of the new system of organizing drilling operations were gradually worked out in the light of the collective opinion. What were the practical results?

Great progress was made by the leading collective of the Al'met'yevsk Administration of Drilling Operations, where all the drillers brigades were converted to work on the continuous cycle. In 3 years of the five-year plan 1,120 wells were activated here with a plan of 1,077. The volume of unfinished construction was reduced by almost one-third, and idling of wells awaiting transfer to the oil and gas extraction administrations was practically eliminated. While in 1975 it took an average of 54.7 days to construct each well here, last year this period was shortened to 39 days.

Nor, by the way, were the fears justified that the drillers would certainly lose in drilling by doing a job not "their own." In Al'met'yevsk the performance of the drilling brigade remained at the same level of 23,000 meters a year, and the collective under D. Nurutdinov drilled no less than 31,000 meters in a year while activating all wells with its own forces.

In a word, the extensive experiment made it possible to raise all the main indices. Over 500,000 more tons of petroleum were obtained by expediting construction of the wells. The large group of Al'met'yevsk drillers was awarded orders and medals of the USSR and Foreman D. Nurutdinov, the originator of the movement, was decorated with the USSR State Prize for outstanding achievements.

The reorganization also had a favorable effect in the general results of the drillers' work. The average duration of construction of one well in the petroleum industry was shortened by 24 days in comparison with the start of the five-year plan. Nearly all the oil and gas extraction associations succeeded in performing their assigned tasks according to this index, so that it can be said that the task assigned the drillers in the Main Directions of Development of

the National Economy for the Tenth Five-Year Plan are being successfully fulfilled.

In the 3½ years of the five-year plan, about 900 wells above the plan have been activated and about 5 million tons of petroleum have been extracted from them. Annual drilling has been increased by nearly 2½ million meters, while the number of drilling brigades has remained the same. Consequently the output per collective has also considerably increased.

These results are also interesting in another respect. In the 3 years of the current five-year plan the activated oil wells were operated above the norm for almost 160,000 days. In terms of crude oil this means that the national economy received several million tons more fuel and valuable chemical raw material. So great a gain (the annual yield of a huge oil field!) was obtained solely by expediting the activation of the extraction capacities.

But this does not mean that all the potentials are being exploited. Not all collectives are as yet working on the continuous cycle. In Western Siberia and a number of other areas where pocket drilling is in extensive use, no well can be activated until the entire "pocket" is drilled out. Consequently in the Tyumen' oil fields it takes 1.5 times as long as the ministry average time to construct the wells, from the start of drilling to delivery to the customer.

Steps are now being taken to improve the situation. The experts of Glavtyumenneftegaz have developed the so-called "combined pocket" system, which makes it possible to test the wells without waiting until all the drilling operations are completed. The new system has been successfully tested, and it is now a matter of applying it in practice.

If the analogy between drillers and builders is pursued further, the question inevitably arises, why not organize their work on a network schedule as at modern construction sites? The first steps in this direction have already been taken. In the Kuybyshevneft' Association, for example, the drilling brigades are supplied with all they need by means of a dispatching card index. The foreman does not have to make out requisitions for materials and equipment or function as a "pusher," as it still often happens. The experience acquired by the Kuybyshev oil workers merits widespread distribution. In the future it can become a good basis for devising composite network schedules for organization of the industrial process in drilling.

Now that most of the brigades have supported the initiative of D. Nurutdinov and his comrades, we feel it is time to take further steps in this direction, namely to reinforce the drilling equipment in every brigade and to entrust it not only with testing the well before activation but also with completing the initial stage (installing the capacity) jointly with the specialized derrick rigging administration.

The drillers in the Komi ASSR have already carried out this idea in practice, and their experience shows that this system makes it possible to prolong the lifetime of expensive equipment and to considerably curtain the inventory of drilling

equipment, But mainly, it affords a real opportunity to still further enhance the drillers' incentive and collective responsibility for activating the oil extraction capacities as rapidly as possible. For then one collective, the drilling brigade, will be entirely responsible for completing all stages of construction (derrick construction, drilling and activation).

In addressing the collectives of Nizhnevartovsk Administration of Drilling Operations No 1 and the Surgut Administration of Drilling Operations No 2 of Glavtyumenneftegaz, Comrade L. I. Brezhnev pointed out the great importance of socialist competition for the highest possible indices in drilling and activating oil wells. Extensive application of the best experience will enable the drillers to make further progress in the effort to obtain the greatest output per drilling brigade and to make the new underground reserves of petroleum and gas available to the nation more rapidly.

5186
CSO: 1822

NEWLY DESIGNED DRILL RIG BEING TESTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 31, Jul 79 p 18

/Article by V. Rudoiskatel', chief designer of drill rigs, Planning Division, Uralmash: "Interdepartmental Boundary"/

/Text/ As a rule heavy machine building products, in both series and custom production, are of large size and weight. In the case of the rig for drilling to a depth of 3,300 meters, the derrick is 45 by 12 meters and the height of the working platform is 15 meters, or that of a three-story house.

That is why a drill rig cannot be completely checked under plant conditions. It is impossible to drill a borehole in an assembly shop or on a plant's premises. Therefore a rig must be checked and given the additional tests at the place of operation.

This gives rise to a contradiction. The machine builders want the customer to perform a number of experiments at the oil fields with new processes for installation and transfer of the rig, to check the interaction of all units, to test the reliability and durability of assemblies of radically new design, and finally to work out in practice the right rules for the safety equipment.

But the customer thinks he has received an entirely completed rig, and he is inclined to attribute supplementary adjustment, checking and refining to its defects, especially since no allowance is made for these operations in his production schedule.

By this time our main customer, Glavtyumenneftegaz, has received 50 rigs for pocket drilling to a depth of 3,300 meters under Western Siberian conditions. And though they have been delivered since 1977, not one of the rigs has passed all of the industrial acceptance tests.

Rig No 9865, for example, which was specified as experimental, was installed at the Fedorovskiy oil field of the Surgutneftegaz Association and activated last June. It passed the first stage of the tests (installation, drilling a borehole and shifting in a pocket) with difficulties, but it passed. But we still cannot

proceed to the final stage of shifting the rig to the next pocket. The unit is still drilling wells in the same pocket for the sake of the planned volume of operations.

Worse than that, in the course of testing a difficulty has already arisen in the experimental checking of pulley grapples of various sizes and also in the unexpected tests of the framework of the pressure lines and assemblies of the circulation system. It is quite impossible to perform these supplementary operations on running machines, and the economic managers of all ranks are understandably and unalterably opposed to unplanned stoppage of any machine.

But let us remember that after the acceptance tests are completed it is necessary to draft the documentation for series production of the innovation, to develop the manufacturing method and equipment and, finally, to place it in production. Besides Uralmash, all this concerns the enterprises of the Ministry of the Electrical Equipment Industry, the Ministry of Chemical and Petroleum Machine Building, the Ministry of Instument Making, Automation Equipment and Control Systems which are supplying supplementary products for drill rigs. All told, the cycle "from plan to introduction" drags out for many years.

Our customers disregard the very near future and use experimental machines solely for the purposes of today. We think the way out of the closed circle is to arrange a special proving ground for all-around testing, adjustment and refining of experimental drill rigs under operating conditions.

A proving ground could be arranged in the system of a large enough consumer of drill rigs like the Surgutneftegaz Association, which receives as many as 30 drill rigs a year from Uralmash alone. It is quite possible to put two or three of them through a proving ground in planned order. The results of the tests will permit rapid modernization of all the other rigs as well as the machines planned for production. Then we could considerably expedite the process of creating new drilling equipment. This proving ground can be constructed on shares, with proportional contributions from the interested ministries, such as the Ministry of Heavy and Transport Machine Building and the Ministry of Petroleum and Gas.

5186
CSO: 1822

FUELS AND RELATED EQUIPMENT

OIL AND GAS DEPOSITS DISCOVERED IN UZBEKISTAN

Moscow PRAVDA in Russian 19 Aug 79 p 2

/Article by A. Khodzhayev, deputy chairman of the Uzbek SSR Council of Ministers, doctor of geological-mineralogical sciences: "Reserves in Reefs"/

/Text/ The work of the republic's scientists and specialists in competition for the USSR State Prize for 1979 has been ascribed as "discovery and prospecting of the vast reserves of gas, gas condensate and sulfur dioxide in the reef complexes of Uzbekistan, which provide for expansion of the nation's fuel and raw material base."

The discovery made in Uzbekistan is of great significance. The nation's geologists well remember Gazli and other gas deposits discovered in Central Asia at the end of the 1950's. But then they found gas in so-called Cretaceous deposits. The new deposits of the blue fuel were discovered in reef rocks, and their presence here was denied by many scientists.

Over 20 oil and gas deposits were discovered in a short time in coral reefs formed several million years ago when there was a sea here. The prospected gas reserves in the republic were at once increased by 1 trillion cubic meters, and at the same the reserves of extractable condensate and sulfur dioxide were also considerably enhanced. Today we can say without hesitation that thanks to these discoveries the "geography" of the nation's gas reserves has been essentially broadened and a strong raw material base has been created for the progress of the gas extraction industry and the regular operation of the existing main gas pip lines of the USSR and those under construction.

Th prospected gas reserves will lend a powerful impetus to further development of the republic's productive forces. The first section of the Mubarek Gas Processing Plant is already operating on the basis of the Urtabulak sulfur dioxide deposit. The second section of this enterprise is now under construction. In fact a new industrial sector, that of gas extraction, has been created in the republic, as well as a sound basis for further growth of the outputs of mineral fertilizers and electric power. The Navoyiskiy and Syrdar'ya GRES's are operating on gas, and construction of the Talimardzhan Electric Power Station, with a capacity of 3.? million kilowatts, is planned.

The noteworthy fact is that the discovery of oil and gas deposits in rocks that were considered unpromising has enhanced the effectiveness of exploratory operations. In outlays per 1,000 cubic meters of prospected gas reserves, Uzbekistan has taken second place in the nation after the Tyumen' regions. Thanks to the high concentration of the reserves (over 5 billion cubic meters per square kilometer) gas extraction is also highly effective. By the next five-year plan the republic will be obtaining a large proportion (60-65 percent) of its gas from these very deposits.

The discoveries are also of great scientific importance. For practically the first time in the nation the possibilities were proved of the new approach to oil and gas prospecting, and it is being successfully applied in the Ukraine, Turkmeniya, Kazakhstan, Belorussia, the lower Volga region, and other regions. The geologists of Uzbekistan had to develop the methods of finding coral reefs, perfect the method and equipment for drilling the wells, and determine the laws of the distribution of these oil and gas reserves.

Seismic prospecting combined with depth drilling were extensively used to locate the reef traps, to the marked improvement of the state of our information. Since 1972 seismic prospecting has become the main method of exploration for gas and carbonate deposits.

Jointly with the scientists of the All-Union Petroleum Scientific Research Institute of Geological Exploration and the Institute of Geology and Prospecting for Oil and Gas Deposits, the specialists of the Uzbek SSR Ministry of Geology determined the types and distribution of the reef complexes, enabling them to reduce the volume of drilling, expedite the prospecting operations and considerably enhance their effectiveness. Problems of combatting hydrogen sulfide and carbonic acid corrosion were also resolved.

The discovery of gas deposits in the reef complexes of Uzbekistan can serve as a good example of the great effectiveness of creative cooperation of science and industry in solving large-scale national economic problems.

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CSO: 1822

NEW PIPELINE CARRIES OIL TO PERM'

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 15 Aug 79 p 1

/Excerpts from article by V. Ukolov, SOTSIALISTICHESKAYA INDUSTRIYA reporter/

/Text/ The oil of Western Siberia came to Perm' yesterday. The first sector of Surgut-Polotsk oil pipeline went into operation. A meeting in honor of the labor victory of the builders was held on the grounds of the Permskaya Pumping Station.

The taiga still rustled here last year, but now the buffer tanks of the huge underground pipeline are silvered, the first machines have started up in the station, and a settlement is springing up close by. By the will of those who assembled to celebrate today and of the comrades whom they represent here, 1,270 difficult kilometers of forest, swamp, mountains and rivers were overcome in a short time.

I think there is no higher or nobler feeling than awareness of honorable performance of a duty. This accounts for both the happy faces and the impassioned speeches. Many have government decorations on their long unworn coats. It is sufficient to say that 35 Heroes of Socialist Labor, the whole flower of the Ministry of Oil and Gas Construction, took part in building the pipeline.

For its collectives this is the main construction job of the year. Its completion enables the producers of Tyumen' to increase their extraction of "black gold" to the extent specified in the general plan of development of the nation's main fuel and energy complex, with no limitations of transportation.

The opening of the new main line in Perm' was impatiently awaited. Strengthening the raw material base for the petroleum refiners of the Urals is a very urgent task. There has not been enough stability in their operations in the past, and now there is a firm basis for fulfilling their patriotic socialist pledges.

The central regions of the country will also receive an additional supply of oil.

The common efforts have ended in a well-deserved common victory. The assembled builders and operators were congratulated upon this by B. Konoplev, first secretary of the CPSU Perm' Obkom.

5186
CSO: 1822

NATIONWIDE PIPELINE CONSTRUCTION PROGRAM DESCRIBED

Moscow EKONOMICHESKAYA GAZETA in Russian No 32, Aug 79 pp 1-2

[Text] Pipelines are used to transport most of the oil extracted in our nation, a large percentage of processed petroleum products and all natural gas. The principal sources of these valuable forms of chemical raw material and efficient fuel are located in the northern and eastern territories, and the principal consumers are situated in the central and western part of the USSR. A network of high-capacity underground lines of great extent has been set up to transport petroleum and gas.

The Twenty-Fifth Party Congress has made the assignment of putting approximately 35,000 km of new gas lines, approximately 15,000 km of new petroleum lines and at least 3,500 km of lines for petroleum products into operation during the Tenth Five-Year Plan. The planned program is being realized.

The installation of main pipelines as well as construction of other facilities is handled by organizations of the Ministry of Construction of Enterprises of the Petroleum and Gas Industry. This is an extensive construction sector with a high level of internal specialization. For example this branch includes organizations for linear pipeline construction, rigging petroleum and gas fields, construction of gas processing plants, compressor and pump stations, housing, recreational facilities and much more. The annual volume of contract work exceeds three and a half billion rubles.

A production base is being developed. This base includes enterprises for making and repairing construction machines and mechanisms, producing equipment packages, thin-walled pipes, prefabricated ferroconcrete, housing construction combines. Every year the industrial enterprises of the ministry produce up to a thousand specialized pipe carriers, about eighty special earth movers, more than two million cubic meters of prefabricated ferroconcrete, up to 4,000 mobile housing units and many other goods.

In three years of the five-year plan, construction and millwright organizations of the Ministry of Construction of Enterprises of the Oil and Gas Industry have put 28,000 km of new underground lines into operation. When

translated into terms of pipes 1,020 millimeters in diameter, the volume of pipeline construction has increased by 25 percent as compared with 1971-1973. Over the last three years, 201 compressor and pump stations have gone into operation with a total power of 7.4 million kilowatts. This is 1.8 times the power of all stations constructed on pipelines in the Ninth Five-Year Plan.

Construction has been completed on a multiple gas line system in the north connecting West Siberia, Ukhta, Torzhok, Minsk, Ivatsevichi and Dolina, with a total length of more than 11,000 km. The first stage has been completed on the line to connect Urengoy, Tyumen' and Chelyabinsk. Kuybyshev-Lisichansk-Kremenchug and Omsk-Pavlodar petroleum lines have been put into operation, and also Nizhnekamsk-Salavat and Lisichansk-Severodonetsk ethylene lines. The mammoth Soyuz gas line constructed with the cooperation of CEMA member nations was started up last year.

The construction of gas lines and petroleum lines is increasing in West Siberia. Over the three and a half years of the five-year plan that have already elapsed, the organizations of the Ministry of Construction of Enterprises of the Oil and Gas Industry have done 5.3 billion rubles worth of construction and millwright work in this region, which is nearly three times the volume over the corresponding period of the Ninth Five-Year Plan.

Many facilities of pipeline transportation are being built at a rapid pace, and are being finished on time or ahead of schedule. At the same time, there are also deficiencies in the work of the ministry. For example, plans were not met in 1978 on starting the Gryazovets-Leningrad and Usa-Pechora gas lines, the second link of the Perm'-Kazan'-Gor'kiy gas line, and the Uzen'-Kul'sary-Gur'yev-Kubyshev petroleum line.

In 1979 the organizations of the Ministry of Construction of Enterprises of the Petroleum and Gas Industry are faced with starting 10,600 km of main gas lines, 4,200 km of petroleum lines and 1,100 km of lines for processed petroleum goods. At the same time, 36 pump stations and 68 compressor stations must be built, as well as other facilities.

Pipeline transport construction people have not dealt with such large and complicated projects heretofore. Dissemination of experience in rapid construction of underground lines, the extensive scope of mass socialist competition for high efficiency and quality will serve as a guarantee that the goals that have been set will be attained.

The main facilities on which construction and millwright work has been developing this year are the Surgut-Polotsk petroleum line (up to Gor'kiy) and the Urengoy-Chelyabinsk-Petrovsk-Novopskov gas line system. These large-scale lines will provide new flows of petroleum and gas from Tyumenskaya Oblast to the central territories of the nation, and to a considerable extent will facilitate meeting quotas on development of the petroleum-gas complex in Western Siberia in the concluding stage of the Tenth Five-Year Plan.

Plans for the present year also call for putting a number of other pipelines into operation.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Providing the National Economy and the Populace with Fuel, Electricity and Thermal Energy for the Autumn/Winter Season of 1979/1980" emphasizes the importance of speeding up completion of the second link of the Perm'-Kazan'-Gor'kiy gas line and the Gryazovets-Leningrad gas line, and also the compressor stations on these lines and on the Vyngapur-Chelyabinsk gas line.

This year a considerable number of main pipelines are being constructed under complicated natural-climatic conditions. For example the extent of swampy sections is 1200 km on the route of the second link of the Urengoy-Chelyabinsk gas line (the first link was built last year). The petroleum line from Surgut to Perm' passes almost entirely over swampy and heavily flooded territory. Therefore in these regions the pipelines were laid in winter with the aid of conventional construction machines and transport facilities.

In January-March a third of the annual program of work was completed on routes in West Siberia, and a fourth of the planned work for the year was completed over the ministry as a whole. Twenty trusts were working simultaneously during the winter on two routes in Tyumenskaya Oblast. Thanks to the concentration of forces and material resources, high daily paces were achieved in welding, insulation and earthmoving work (22-23 km of gas lines and 20-21 km of petroleum lines).

Active competition has developed on all sections. As a result, 2600 km of large-diameter petroleum and gas lines have been laid in a single winter.

However, because of negligence in job organization on the lines, construction machines and equipment have stood idle. The clients, the Ministry of the Petroleum Industry and the Ministry of the Gas Industry, have held up the delivery of planning documentation and equipment for starting pump and compressor stations.

Although the main jobs on the petroleum line from Surgut to Perm' have been completed, it failed to go into operation as planned in the second quarter. Work has also been dragging in testing the second link of the Urengoy-Chelyabinsk gas line, where additional graveling and backfilling of the soil has been necessary on some sections constructed during the winter.

Defficiencies in the work of Glavukrneftegazstroy and Glavyuzhtruboprovodstroy have held up deadlines on starting such pipeline sections as Ivatsevichi-Dolina, Shebelinka-Dnepropetrovsk-Krivoy Rog-Izmail.

In the first six months of the year, organizations of the Ministry of Construction of Enterprises of the Petroleum and Gas Industry have done 4.4 percent more contract work than during the same period last year. Yet the six-months assignment has been 99.6 percent completed.

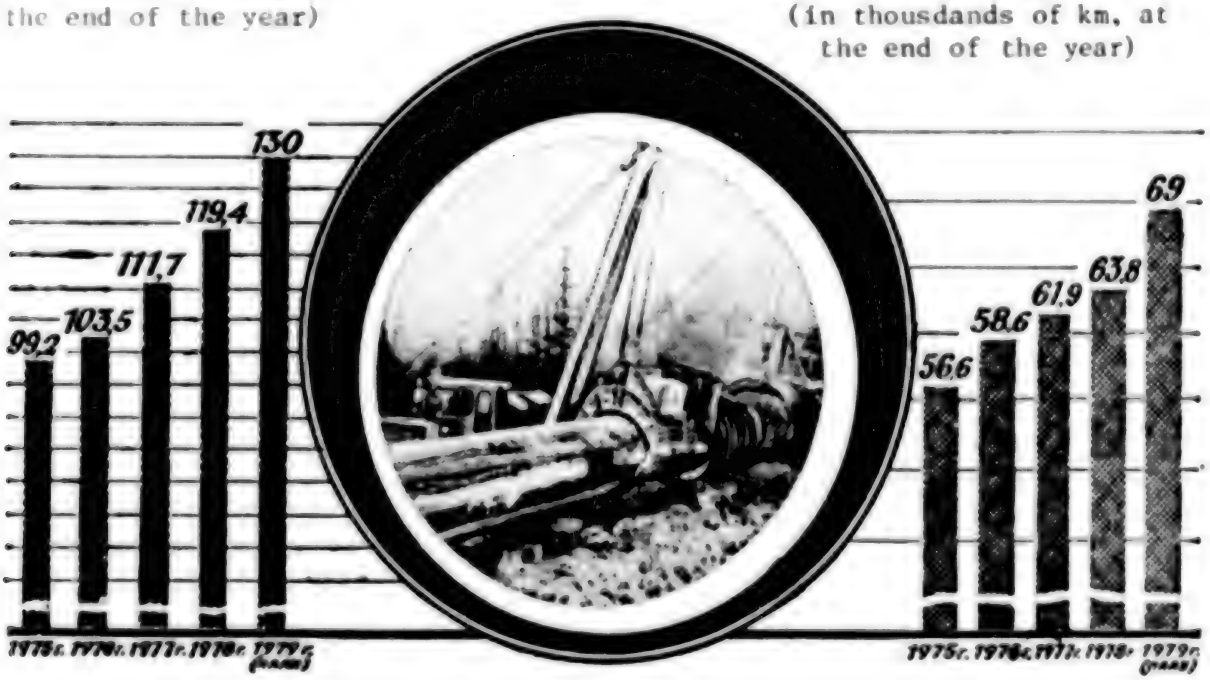
The Second Six Months -- a Decisive Period

The second six months are a decisive period for construction of pipeline transport facilities. Success in meeting the quota for the year depends primarily on efficient organization of production and work on the lines, and on systematic introduction of the experience of leading collectives and production innovators.

Many collectives have made high marks in socialist competition. Among these are the Samotlornefteprомstroy, Tyumengazmontazh, Bukharagazpromstroy and Promstroymaterialy trusts. They were awarded challenge Red Banners for their achievements last year by the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Central Committee of the Leninist Young Communist League of the Soviet Union. Even now they continue to be leaders in competition.

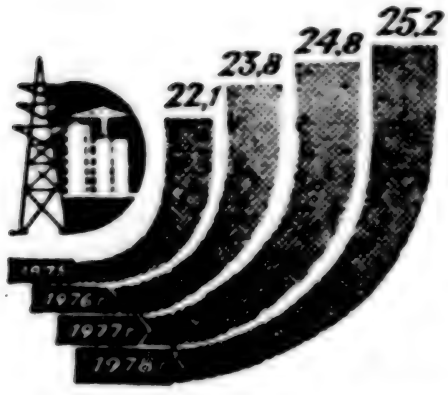
B. P. Diduk's brigade of the Severtruboprovodstroy Trust is an example of selfless labor. For five months of the winter of 1978-1979 this team did high-quality work on construction and installation of a 120-kilometre section of the Urengoy-Chelyabinsk gas line. This collective, working in the uninterrupted team method, creatively generalizing the experience of the best builders on northern lines, ably mastered the separated-flow method of laying pipelines. The brigade has a stable link staff, and all workers have mastered related specialties. The change of shift is done during work, without loss of time. A fast pace is maintained by extensive use of small-scale mechanization. B. P. Diduk's brigade was one of the first in the sector to enter competition on the "worker's relay race" principle on an agreement basis with other collectives of a large-scale process line.

Increase in the Length of Gas Lines (in thousands of km, at the end of the year)



Increase in the Length of Lines for Oil and Petroleum Products (in thousdands of km, at the end of the year)

AVERAGE INCREASE IN WORKER-POWER RATIO
ON CONSTRUCTION SITES OF THE MINISTRY
OF CONSTRUCTION OF ENTERPRISES OF THE
PETROLEUM AND GAS INDUSTRY
(Kilowatts per person)



The brigades of M. I. Buyanov and Yu. I. Kil'dyushev have been leaders in initiating high-efficiency continuous-flow organization of work in the construction of pump and compressor stations. Systematic division of labor and cooperation, combining of trades, and clear planning are yielding remarkable results. The two brigades working together have spent 730 working days to build ten oil pumping stations instead of the standard 1580 days.

However, there continue to be serious deficiencies in the organization of mass competition in the sector. Formalism still persists in the acceptance of socialist obligations and summing up their results. In a number of trusts and construction-millwright administrations there are considerable losses of working time as well as unsatisfactory utilization of construction machines and transport facilities. For a long time now there has been a lag and inability to handle planned quotas in such trusts as Omsknefteprovodstroy (directed by B. A. Nikitenko), Vostoksibtruboprovodstroy (directed by V. I. Baltun) and Shkapovneftestroy (directed by V. F. Shendel').

The ministry is doing considerable organizational and procedural work on studying, generalizing and disseminating leading experience. Schools are held on innovative methods of work, meetings are arranged with competition prize winners, materials are published on achievements and initiatives. However, the necessary competitiveness and activism have not yet been reached in this area.

An important job is to accelerate the changeover to brigade contract work in pipeline construction. Analysis shows that last year 570 million rubles worth of construction and millwright work was done by the progressive method, or 17.6 percent of the total job volume. The resultant savings over estimated job costs was 28.3 million rubles.

The recommendations of the All-Union Practical Science Conference "Socialist Competition, the Movement for a Communistic Attitude Toward Work -- a Vigorous Means of Development of the Creative Activity of the Masses and Indoctrination of the New Man" point out the necessity for more extensive utilization of cost-accounting methods of organizing competition of builders' collectives. This applies in full measure to the Ministry of Construction of Enterprises of the Petroleum and Gas Industry.

New Equipment on the Lines

There is a continuous increase in the scales of construction of main pipelines and in their capacity. At the present time gas lines and petroleum lines are being made mainly from pipes with a diameter of 1,020-1,420 mm. The requirements for their quality and reliability are on the increase. Since the beginning of the five-year plan, the scientific research, design and planning, and production organizations of the Ministry of Construction of Enterprises of the Petroleum and Gas Industry have made considerable strides on creating and producing new models of high-productivity machines, mechanisms, and facilities for quality control in construction.

As a rule, main pipelines are now being built by large-scale mechanized production lines. These systems perform all technological operations and leave behind them two or two and a half kilometres of finished pipeline every twenty-four hours. Today's builders are armed with powerful rotary excavators for digging trenches with a capacity of 1,200 cubic meters per hour in packed and frozen ground.

New pipe-laying machines are being made, including units with an extensible base. Combines are being made that do the work of both cleaning and insulating machines. Among the innovations in transport facilities is the Tsiren' swamp vehicle with a load capacity of 36 metric tons. Designs are being developed for other all-terrain vehicles. A pontoon complex is in the tryout stage, and hovercraft ATV's are being tested.

Field welding equipment is being improved. Half of all the welds on main pipelines are now being made automatically. The Ye. O. Paton Institute and the Ministry of Construction of Enterprises of the Petroleum and Gas Industry have made models of the Sever complex for resistance welding of pipes 1,420 mm in diameter. The Sever has gone through experimental-industrial operation on the Urengoy-Chelyabinsk line. Its advantage is complete automation of the welding cycle. According to preliminary estimates, the use of a single complex will save 1.8 million rubles.

Unfortunately, the Severtruboprovodstroy Trust has been unable to organize proper experimental-industrial operation of the new complex. Preventive maintenance was poorly set up, there were periods of lost time. This should serve as a lesson. New equipment requires constant concern and attention on the part of business leaders. There is a future for this kind of resistance welding in pipeline construction.

Unflagging Attention to Work Quality

The working efficiency and reliability of underground lines is largely determined by the quality of insulation and electrochemical protection from soil corrosion. All large-diameter pipelines are now covered with polymer films in protective sheaths that have much better properties than asphalt insulation. Electrochemical protection is provided for 91 percent of all gas lines and 96 percent of petroleum lines.

However, the cardinal solution of the problem, the reliability and durability of underground lines are tied up with application of coatings on the pipes in the supply plants of the USSR Ministry of Ferrous Metallurgy. The production of insulated pipes has been inexcusably delayed, as discussed in issue No 21 of "Ekonomicheskaya gazeta."

A "Complex Scientific and Technical Program on Improving Construction Quality and Reliability of Pipelines" is currently being carried out. A State Inspection on Construction Quality is in operation in the sector. In addition, there are inspection services in all construction subdivisions.

Checking weld quality is the most responsible job. Inspection is improving in this area.

The organizational and technical steps being implemented are bringing in positive results. Ninety-three percent of the pipelines last year were put into operation with "good" and "excellent" marks.

The quality of pipeline construction must be further improved, and the designers and suppliers of pipes and materials must be more actively involved in this work. The quality of electrodes supplied by the enterprises in Penza, Orel and Komsomol'sk-na-Amure remains low. The Ministry of the Chemical Industry must improve the quality of insulating film.

There is a large job volume that must be completed on pipeline construction routes before the end of this year. There must be an increase in the responsibility of business directors on all levels for meeting quotas, reinforcing plan discipline, giving wide scope and efficacy to socialist competition. The collectives of organizations of the Ministry of Construction of Enterprises of the Petroleum and Gas Industry are called upon to make thorough and comprehensive preparations for the forthcoming winter construction season.

6610
CSO: 1822

FUELS AND RELATED EQUIPMENT

ROLE OF GEOLOGICAL EXPLORATION IN NATIONAL ECONOMY

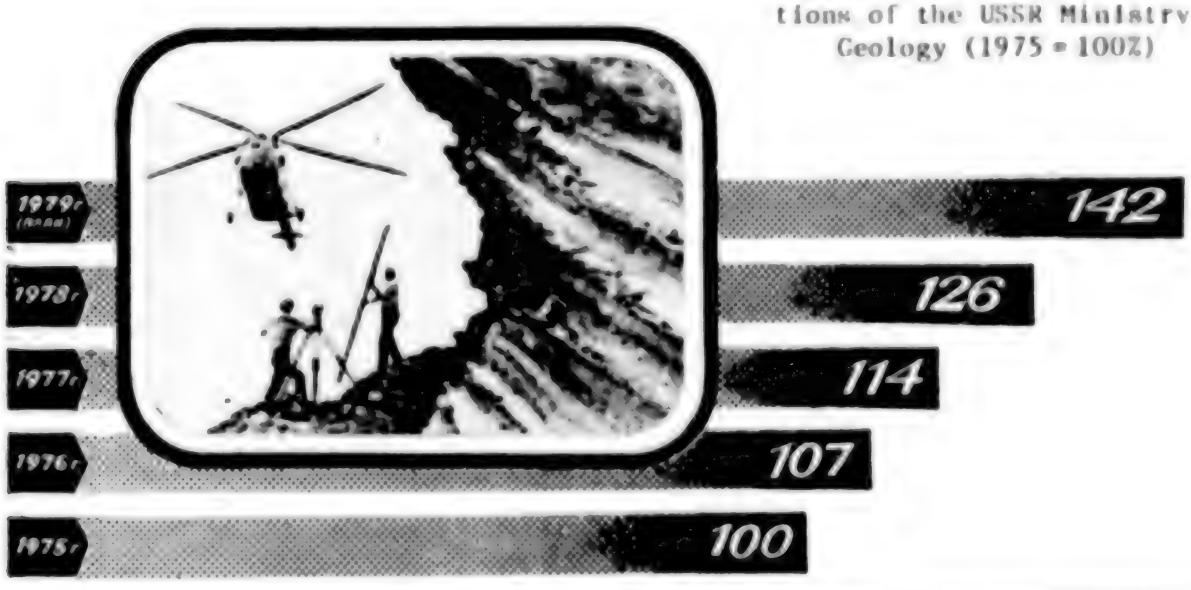
Moscow EKONOMICHESKAYA GAZETA in Russian No 35, Aug 79 pp 1-2

[Text] A reliable mineral and raw material base has been created as a result of the systematic geological study of mineral resources of the Soviet Union. This has been the foundation for setting up new territorial-production complexes and continued growth of the economic potential of the eastern and northern regions.

The dynamic development of Soviet economy is causing a rapid rise in requirements for various kinds of mineral raw materials, which means that the pace of expansion of proved mineral reserves must keep ahead of mineral recovery.

In conformity with the resolutions of the Twenty-Fifth Congress of the CPSU, geological exploration work is expanding in the Tenth Five-Year Plan. As shown by the histogram below, the volumes of this work done by the USSR

Growth in Volume of Geological Exploration Work in Organizations of the USSR Ministry of Geology (1975 = 100%)



Ministry of Geology this year are 42 percent higher than in 1975. The increase in deep exploratory drilling for petroleum and natural gas will amount to 38 percent, the increase in mechanical core drilling will be 12 percent, and underground drivage will increase by 25 percent.

In the first three years of the five-year plan, geological prospectors have solved a number of important national economic problems. The fuel-energy raw material base has been expanded, ensuring further development of the oil and gas industry in Tyumenskaya and Orenburgskaya oblasts, the Komi and Urdut ASSRs, and also an increase in natural gas recovery in Turkmenia, Uzbekistan and the Ukraine. Reserves are being prepared for oil extraction on Buzachi Peninsula in Kazakhstan. A new gas field has been discovered and is being explored in Nizhneye Povolzh'ye. There has been a considerable increase in reserves of explored coal fields in the Donetsk, Kuznetsk and Kansk-Achinsk basins.

Proved reserves of iron ore have increased in the territories of the Kursk Magnetic Anomaly, the Krivoy Rog Basin and East Siberia. The raw material base for nonferrous metallurgy has been reinforced in the southern Urals, Uzbekistan and Kazakhstan. Exploration has been completed on new deposits of high-quality aluminum raw material. New raw material deposits for producing mineral fertilizers have been discovered and prepared.

The work has taken on considerable scope for agriculture. A number of underground water deposits have been explored that can be used for water supply to kolkhozes and sovkhozes, for irrigation, and for flooding pastures in arid regions of Soviet Middle Asia, Kazakhstan and the Ukraine. The proved reserves of peat and local construction materials have increased in the non-Blackearth region of the RSFSR.

There has been a considerable increase in the regional geological study of the territory of the nation, including the shelf regions of seas and oceans. There has been an increase in the level of scientific substantiation of areas of geological exploration and rational planning.

Thanks to the selfless labor of geological prospectors in 1975-1978, the principal planned technical-economic indices in the sector have been reached, including those for drilling and drivage.

The plans for 1979 call for an increase by 12.5 percent over last year in the volume of geological exploration throughout the USSR Ministry of Geology, including an increase by 20.2 percent in deep exploratory drilling for oil and natural gas. The increase in proved reserves is planned in larger amounts than in 1978 for twenty kinds of minerals. Geological prospecting is being intensified for petroleum and natural gas in West and East Siberia, the Timan-Pechora oil fields and West Kazakhstan, for coking coal in the major coal fields of the nation, and for ferrous and nonferrous metals in the territory of the Baykal-Amur Railroad, Kazakhstan, Uzbekistan, the Urals and the Ukraine.

VOLUME OF DEEP EXPLORATORY
DRILLING FOR OIL AND GAS
IN THE USSR MINISTRY OF GEOLOGY
(1975 = 100%)

In the offing for this year is the drilling of nearly 3.3 million metres of deep exploratory oil wells and natural gas wells, and about 21 million metres of mechanical core drilling, drivage of about 324,000 running meters of underground rock drifts, and considerable improvement of the technical-economic indices of work in the sector.

By extensively developing socialist competition for pre-deadline completion of the quota for 1979 and for the entire five-year plan, an army of a half million geological prospectors has completed the assignment set for the first six months on increasing the proved reserves for all kinds of minerals, and to a great extent has exceeded this assignment without any increase in appropriations. Seventy new deposits of petroleum and gas have been discovered as well as a number of deposits of ferrous and nonferrous metals and ground water.

In three and a half years of the five-year plan, the workers of the sector have fulfilled the four-year assignment on increasing proved reserves of natural gas, chromite ore, zinc, tungsten, molybdenum, mercury, tantalum, fluorspar and Icelandic spar. The major increase has been on large deposits

located close to operating mining enterprises or in economically developed regions of the nation. The increase that has been achieved in reserves of mineral raw materials considerably exceeds the volumes of mineral recovery.

There are enterprises in the system of the USSR Ministry of Geology that make consumer goods from colored stones. In the three years of the five-year plan the enterprises of the Soyuzkvartssamotsvety All-Union Production Association of the USSR Ministry of Geology have increased the output of goods made from naturally colored stone by a factor of 1.6. In this time thirty new production items have been developed, and there has been an improvement in the quality of more than two hundred items that have enjoyed increased demand. This year the production of consumer goods (in comparable prices) is rising by a factor of more than two as compared with 1975. The Soyuzkvartssamotsvety enterprises have fulfilled the quota for six months.

Alignment with the Front Ranks

High marks have been achieved by the collective of the Irkutsk Territorial Geological Administration, the initiator of socialist competition in the sector for further increasing the efficacy and quality of geological exploration work, for fulfillment of planned quotas by all brigades and sections. In the first six months this collective has exceeded all geological quotas and technical-economic indices, and has realized the plan for construction of housing and recreational facilities.

The collective of Glavtyumen'geologiya made considerable advances in January to June. It achieved pre-deadline completion of the assignments of the five-year plan for increasing the proved reserves of natural gas. Last year, the Tyumen' geological prospectors exceeded the plan for increasing the proved reserves of petroleum and condensate. They are continuing their good work this year as well. The quota for the first six months has been surpassed. Success in studying the mineral riches of West Siberia has been facilitated by substantial measures of an organizational nature. For example, four gas and petroleum prospecting associations and two large construction and millwright trusts have been set up recently in the Glavtyumen'geologiya system. In a single year the volume of deep exploratory drilling for oil and gas has risen by a factor of 1.4.

The workers of the Udmurt exploratory drilling trust have completed the five-year plan quota for increasing the proved reserves of petroleum.

The West Siberian, Arkhangel'sk, Buryat, Northeast, Yakut, East Kazakhstan and Central Kazakhstan territorial geological administrations, associations of the Uzbek SSR Ministry of Geology, trusts of the Ukrainian SSR Ministry of Geology and many other geological organizations have been doing good work in 1979.

Leading brigades have come out with important initiatives, showing the value of utilizing production reserves. For example the drilling brigades led by

F. Z. Rymarenko and N. L. Tikhanovskiy of Chernigovneftegazrazvedka Trust have done additional volumes of drilling by using money that has been saved. In Tyumenskaya Oblast the brigades of V. S. Solov'yev, A. A. Khalin and V. A. Makar achieved the highest labor productivity in deep exploratory drilling.

The numbers of front-rank workers are increasing in organizations of the USSR Ministry of Geology. In three and a half years the collectives of 52 drilling and drivage brigades have completed their five-year quotas, and 688 brigades have completed the four-year assignment ahead of schedule.

There are Extensive Reserves

However, analysis of the results of business activity of the USSR Ministry of Geology in the first six months shows that available reserves and possibilities for improving the effectiveness of geological exploration work, increasing the mineral reserves and shortening deadlines for proving deposits are far from fully utilized. Twenty-five geological organizations have failed to manage their quotas on increasing the rate of drilling deep exploratory wells and on mechanical coring. Only five republic-wide geological organizations have met the quota for increasing labor productivity.

Of sixteen organizations that are prospecting for petroleum and natural gas in the Russian Federation, eleven territorial administrations and trusts have not met the six-month quota on deep exploratory drilling. Among those that are farthest behind are the trusts managed by V. D. Tokarev and B. O. Taksior.

A great deal remains to be done by the USSR Ministry of Geology and its organizations to eliminate deficiencies in business activity and increase job efficiency.

Systematic mass dissemination of the experience of leading collectives should be organized. Widely known for their achievements are the deep exploratory drilling brigades of N. D. Glebov, A. A. Zhukov and M. D. Avramets, the mechanical coring brigades of A. Ye. Nitsak, V. Ya. Gubin and N. S. Armenov, the drivage brigades of G. Ye. Khodyrev, T. Imamaliyev and G. S. Akhmetzhanov, and a number of others. Their technical-economic work indices are one and a half to two times higher than the average in the geological prospecting organizations where these brigades are working.

At the same time, about a third of the drilling and drivage brigades of the sector are unable to handle their assigned quotas, and nearly half the brigades are lagging in the RSFSR Ministry of Geology. In most cases this is due to poor organization of labor, down time, violations of technological and production discipline. For example in the same RSFSR Ministry of Geology the nonproductive expenditures of time in the first six months on deep exploratory drilling have been 34.2 percent, and in the Orenburg Geological Administration (chief I. A. Shpil'man) -- 44 percent, including about 30 percent for organizational reasons. There are reserves for better use of

working time in Glavtyumen'geologiya, and in the Yakut, Far East, North Caucasus and other administrations. A progressive form of cost accounting -- the brigade contract -- has not been strongly implemented.

It is to be expected that the USSR Ministry of Geology and the republic ministries, business leaders of geological associations, administrations and trusts will decisively improve the organization of socialist competition, and will overcome the lag of individual brigades and labor collectives.

As pointed out in steps taken by the Party and the Government to improve the business mechanism, it remains to work out and implement extensive development of the brigade form of organization and work incentive in all sectors. The brigade form of labor has been used for a long time now in geological exploration work. Now we need to give it greater efficacy.

Science and Production

Since the beginning of the five-year plan, scientists, designers and specialists in the sector have developed new and highly effective methods and means of locating and exploring mineral deposits. There has been an improvement in the equipment for geological exploration work, increased use of progressive geophysical and geochemical methods, utilization of high-altitude and space facilities for geological research.

The future efficacy of prospecting for minerals depends to a great extent on improvement of existing technical facilities and methods of geological research, and development of new ones, raising the level of scientific forecasting and prognosis, economic substantiation of the main areas of exploration and prospecting. The USSR Ministry of Geology presently includes 86 scientific research and two design institutes, and five design offices. They employ more than 40,000 workers, including more than 400 doctors and about 5,000 candidates of sciences. Thus geological prospecting production has an extensive scientific potential, and personnel that are capable of handling the problems facing the sector in improving the technical level, efficiency and quality of geological prospecting work.

Over the elapsed period of the five-year plan, sector-wide science has made a considerable contribution to working out criteria for regional and local forecasting of mineral deposits, setting up effective methods and new means of locating and exploring them. Research is developing in the field of economics of geological prospecting production and mineral raw materials.

But we cannot ignore the fact that the creative activity of a number of scientific research, design and planning organizations still does not meet the current requirements of scientific and technical progress. The attention of institutes has not been concentrated to a sufficient extent on solving root problems of increasing the pace of growth in labor productivity and the quality of work on preparing reserves of mineral raw materials. Dissipation

of scientific forces as well as allocations for minor and secondary topics remain to be overcome. At the same time, the results of finished scientific jobs frequently remain unused in practice.

One serious deficiency is that up until now the sector has lacked a definite system of major indices for evaluating the economic effectiveness of geological prospecting work, and rational complexes of methods for doing searches and explorations. There is a blatant lag in developing and introducing highly effective geophysical, drilling and laboratory-analytical techniques and equipment.

Improvements are needed in the coordination of scientific research done by institutes of the USSR Ministry of Geology, the USSR Academy of Sciences and other ministries and agencies dealing with the geological study of the earth's interior, fundamental research in the area of conditions of formation and patterns of distribution of mineral deposits in the earth's crust. The experimental base of institutes in the sector is developing slowly. In many cases the specialized scientific institutions are dealing with an unjustifiably broad class of problems.

The organizational structure is now being changed to conform to the general scheme of administration of the sector. Provisions have been made for setting up 67 geological production associations, and a number of Soviet-wide industrial, scientific-production and production associations. These associations represent a unified business production complex in which science and production are organically merged, rather than a mere mechanical joining of organizations and enterprises. To this end, twenty scientific research institutes of the sector have been put under the immediate jurisdiction of the associations.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Intensifying the Influence of the Business Mechanism on Raising Production Efficiency and the Quality of Work" orients the workers of the geological sector toward achievement of high final results, attainment of the greatest increase in proved mineral reserves for every ruble of production expenditures, toward supporting the development of our economy with all necessary mineral and raw material resources.

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BRIEFS

GAS LINE PROTECTION--The Avtomatika Plant in Kirovakansk is now producing a new device, the type ARTZ automatic protection current regulator. The unit is designed for protecting petroleum and gas mains and other underground installations from soil corrosion in territories with seasonal ground changes and unstable supply line voltage. According to its technical specifications, the new device is four times as powerful as the series KSS-1200 units produced at the enterprise. It will be extensively used in the national economy of the nation. The plant's main designer G. Zurabyan, as well as designers and technologists S. Dilanyan and others have made a considerable contribution to development of the ARTZ and putting it into production. The job of producing the new item was attacked with vigor by machinist-fitters A. Vartanyan, A. Grigoryan, foreman of the chassis division S. Nazlukhanyan, and welders Kh. Altunyan and T. Simonyan, who surpassed their shift quotas by 15-20 percent. The first 29 units have already been dispatched to Yerevan, Minsk, Saratov and Khar'kov. Before the end of the year, customers will have received more than 200 automatic protection current regulators. [Text] [Yerevan KOMMUNIST in Russian 21 Jul 79 p 2] 6610

DESERT PIPELINES--Ashkhabad--The collective of the NAIPZgazstroy Trust has put more than a million rubles of capital investments into operation on construction of national-economic facilities above their quota for this year. Installation of a large-diameter pipe has been completed ahead of schedule on the route of the new gas main from the Uchkyr deposit. The pre-deadline start of the first phase of the high-capacity gas line between Depchizkul'-Khauzak and Mubarek will provide tens of millions of cubic meters of extra gas daily for the Mubarek Gas Refinery. [Text] [Moscow IZVESTIYA in Russian 1 Aug 79 p 1] 6610

NEW DRILL RIG--Tomsk--Drilling of the first cluster (a group of wells from a common base) has been started by Tomsk oilmen at the Olen' deposit. A new Uralmash rig is being used that is specially designed for cluster drilling. The rig is moved from well to well on rails. [Text] [Moscow IZVESTIYA in Russian 1 Aug 79 p 1] 6610

NEW GAS LINE--Leningrad--"Blue fuel" has come to the city through the Gryazovets-Leningrad gas line. Working on a tight schedule, builders have completed the installation of a 600-km main from the Siyanive Severa pipeline. This will improve the supply to enterprises and new subdivisions of the city, and will increase fuel delivery from deposits of West Siberia and the Komi ASSR to the central territories. Builders have been working under complicated

conditions: the route passed over swamps and mires, and crossed the Volkhov and Neva rivers. The latest earthmoving and pipelaying equipment and helicopters were used in the construction, and the progressive modular method was employed in which the components of compressor stations were preassembled at the manufacturing plant and then installed on the construction site. More than nine billion cubic meters of fuel will be sent yearly through this main line. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 33, Aug 79 p 5] 6610

DESERT GAS MAIN--Gaz-Achak--Builders of the Naipgazstroy Trust have completed installation of the first phase of the Dengizkul'-Kauzak-Mubarek gas main. Gas will flow through the line from the Uch-Kyr deposit to the Mubarek Gas Refinery. The new line covers more than 60 km. Now the collective of the trust in cooperation with specialists of the Azneftegazmontash Trust are getting ready to start an important new facility in the fourth year of the five-year plan -- a complex for producing liquefied gas. Major installation jobs have been completed, two upper-level installations weighing 150 metric tons have been built as well as a pumping station, a gas-blowing compressor department, reservoirs and other facilities. The builders and millwrights plan to complete the facility in the near future. Actuation of the complex will meet the domestic needs of the populace for liquefied gas. [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 20 Jul 79 p 4] 6610

LARGE GAS DEPOSIT--Ashkhabad--Geological prospectors of Turkmenistan, concentrating drilling work on areas with good prospects, have discovered a new large deposit of natural gas. The resources of this pool are considerably greater than the reserves of the rich Shatlyk deposit that is now being intensively worked. The high-capacity gas-processing complex that has arisen in the vicinity of Shatlyk and that is feeding the system of gas mains between Soviet Middle Asia and the central regions, now has an even richer raw material base. According to estimates of geologists, the future development of this base will take the course of comprehensive acquisition as a large unified underground storehouse with large reserves of gas and gas condensate. This will facilitate effective utilization of facilities for automation and modern high-productivity equipment. [Text] [Moscow IZVESTIYA in Russian 9 Aug 79 p 3] 6610

NEW CONSTRUCTION MATERIALS PLANT--Kharp, Tyumenskaya Oblast--The riverboat caravans that deliver all kinds of freight to the Tyumen' Transpolar Territories have just recently returned empty. And now the holds of barges that are coming up from the lower reaches of the Ob' are filled with gravel, ferroconcrete items and flagstones. The Kharp Construction Materials Plant has started operation here in the polar Ural Mountains. The output of the plant is needed by the oil fields of Surgut, Nizhnevartovsk, Neftetyugansk. The young enterprise is growing. A large facility for making gravel begins operation this year. A crushing and sorting plant is being built. [Text] [Moscow IZVESTIYA in Russian 9 Aug 79 p 1] 6610

PIPES FOR SIBERIA--Novomoskovsk, Dnepropetrovskaya Oblast--Nizhnevartovsk, Nefteyugansk, Samotlor -- these are the addresses shown on freight cars

being dispatched to the long road from the approach tracks of Novomoskovsk Pipe Plant. A. Shvedchenko, director of the enterprise, tells us that the plant has sent 65,000 metric tons of pipes of different diameters to the petroleum and gas lines being built in West Siberia. All these goods have been marked with the Emblem of Quality. The metallurgists have also met orders ahead of schedule from the builders of the Sayano-Shushen' Hydroelectric Plant and the Baykal-Amur Line. They have provided many hundreds of tons of pipes for construction of water and heat mains. [Text] [Moscow IZVESTIYA in Russian 9 Aug 79 p 3] 6610

NATURAL GAS--The Neftyanyye Kamni Offshore Oilfield (Azerbaijan SSR), which has previously supplied petroleum alone, will now start providing the national economy with natural gas. Specialists of the Kaspmorneftegazstroy Trust joined the oil field yesterday to Zhiloy Island by a 33 km pipeline. Here they cut the new line into the existing gas pipeline connected with Bol'shaya Zemlya. Construction will begin next year of the oil pipeline from Neftyanyye Kamni to the mainland, which will release a whole flotilla of tankers now delivering fuel to Bol'shaya Zemlya. /Text/ /Moscow MOSKOVSKAYA PRAVDA in Russian 19 Aug 79 p 1/ 5186

NATURAL GAS--Specialists of the Kaspmorneftegazstroy Trust have joined the Neftyanyye Kamni Offshore Oilfield with Zhiloy Island by a 33 km pipeline. Here they cut the new line into the existing gas pipeline connected with Bol'shaya Zemlya. /Text/ /Moscow PRAVDA in Russian 19 Aug 79 p 2/ 5186

PERM' OIL--The plants of the Permnefteorgsintez Association were the first to receive Tyumen' oil via the Surgut-Polotsk main oil pipeline now under construction. The builders put through the most difficult sector of the main oil pipeline, from Surgut to Perm', 3 times as fast as the norms required. The new pipeline will reliably supply the petroleum processing enterprises of the Urals, the Volga region and the center with raw material. /Text/ /Moscow MOSKOVSKAYA PRAVDA in Russian 15 Aug 79 p 1/ 5186

GAS TO STAVROPOL'--Selo Novoselitskoye, a rayon center, has been connected to the main gas pipeline. The layout of the network of pipelines to supply homes with gas has been started. In 3½ years of the Tenth Five-Year Plan in all, over 85,000 residences in Stavropol' have been supplied with gas, more than half of them in rural areas. /Text/ /Moscow PRAVDA in Russian 9 Aug 79 p 6/ 5186

SHIPPING BY PONTOONS--Special pontoons adapted to navigation in Arctic ice were required to deliver heavy equipment for the new petroleum and gas enterprises of Siberia. These huge machines could not be deposited on flatcars and had to be shipped to their installation points by sea. The first group of pontoons set out from Kola Bay, where ships of a strange caravan assembled before the onset of the Arctic icefields. They are to be towed into the Ob' Gulf under cover of powerful ice breakers, and there the river workers of Siberia will take over from the Arctic seamen. Never has the Arctic known such an experiment. Powerful nuclear

and diesel ice breakers, careful study of the ice routes, and the great skill of the seamen contributed to the success of the strange caravan. [Text] [Moscow MOSKOVSKAYA PRAVDA in Russian 3 Aug 79 p 1] 5186

OIL RIG--A drilling derrick has crossed the Terskiy range. Twenty powerful tractors transported it in assembled form on special sledges. The petroleum prospectors of the Chechen-Ingush ASSR are steadily expediting the construction of drill rigs. [Text] [Moscow MOSKOVSKAYA PRAVDA in Russian 3 Aug 79 p 1] 5186

METHANE GAS--From the scourge of the miners methane gas has become a convenient fuel in many boiler rooms in the Donbass mines. Until now a good deal of methane was wasted because it is subject to explosions when delivered in pure form to boiler rooms. Scientists of the Donets Polytechnic Institute have helped to make methane safe by enriching it with a small quantity of natural gas. The new method ensures complete safety and permits automation of boiler room burners. [Text] [Moscow MOSKOVSKAYA PRAVDA in Russian 8 Aug 79 p 1] 5186

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